

LKC
TK
6570
.P8
P82
2003

IC

Public Safety Radiocommunications Project

Final Report

March 2003
Released Version



Public Safety Radiocommunications Project

Final Report

March 2003
Released Version





Public Safety Radiocommunications Project

Final Report

March 2003
Released Version



Industry Canada
Library - Queen

JUN - 7 2011

Industrie Canada
Bibliothèque - Queen



Foreword

Canada's public safety community is comprised of thousands of dedicated professionals and volunteers who serve the public in law enforcement, firefighting and emergency medical response. The authors wish to thank the many individuals from coast to coast who participated enthusiastically in this project and contributed to this research.

We also wish to recognize and thank the following organizations who met with us during the course of our consultations across Canada:

<i>Alberta Solicitor General</i>	<i>N.B. Public Safety</i>
<i>Alliant Telecom</i>	<i>Newfoundland Emergency Measures Organization</i>
<i>APCO Canada</i>	<i>Newfoundland EMO/Fire Commissioners Office</i>
<i>APCO International</i>	<i>N.S. Dept. of Transportation & Public Works</i>
<i>Bathurst Police</i>	<i>N.S. Emergency Communication</i>
<i>B.C. Dept. of Fisheries and Oceans</i>	<i>N.S. Emergency Medical Care</i>
<i>B.C. Ministry of Forests</i>	<i>Office of Critical Infrastructure Protection and</i>
<i>B.C. Ministry of Health Services</i>	<i>Emergency Preparedness</i>
<i>B.C. Ministry of the Solicitor General</i>	<i>Ontario Ministry of Public Safety and Security</i>
<i>B.N.P.P. Regional Police Service</i>	<i>Ontario Provincial Police</i>
<i>Brampton Fire & Emergency Services</i>	<i>Ottawa Police Service</i>
<i>Brockville Police Service</i>	<i>P.E.I. 911 Administration Office</i>
<i>Calgary EMS</i>	<i>P.E.I. Ambulance Operators</i>
<i>Calgary Fire and Ambulance</i>	<i>P.E.I. Community & Cultural Affairs</i>
<i>Calgary Police Services</i>	<i>P.E.I. Dept. of Prov. Treasury</i>
<i>Canadian Armed Forces</i>	<i>P.E.I. EMO</i>
<i>Canadian Association of Chiefs of Police</i>	<i>P.E.I. Firefighters Association</i>
<i>Canadian Association of Fire Chiefs</i>	<i>P.E.I. Fire Marshall's Office</i>
<i>Canadian Wireless Telecom Association</i>	<i>P.E.I. Police Chiefs Association</i>
<i>Cape Breton Regional Police Service</i>	<i>Peterborough Fire Department</i>
<i>Coalition for Improved Public Safety</i>	<i>Police de la communauté urbaine de Montréal</i>
<i>Communications</i>	<i>Radio Advisory Board of Canada</i>
<i>Conseil du Trésor, Gouvernement du</i>	<i>Rothesay Regional Police</i>
<i>Québec</i>	<i>Royal Canadian Mounted Police (HQ)</i>
<i>Coopérative des Techniciens Ambulanciers</i>	<i>Royal Canadian Mounted Police Atlantic Region</i>
<i>de l'Outaouais</i>	<i>Royal Canadian Mounted Police Central Region</i>
<i>CREST, Victoria, BC</i>	<i>Royal Canadian Mounted Police Pacific Region</i>
<i>Department of Fisheries and Oceans</i>	<i>Royal Canadian Mounted Police NW Region</i>
<i>DTI Telecom</i>	<i>Royal Canadian Mounted Police "A" Division</i>
<i>E-Comm</i>	<i>Royal Canadian Mounted Police "B" Division</i>
<i>Edmonton Police Services</i>	<i>Royal Canadian Mounted Police "E" Division</i>
<i>Edmundston Police Force</i>	<i>Royal Canadian Mounted Police "K" Division</i>
<i>EDS/Strategis Group</i>	<i>Royal Canadian Mounted Police "H" Division</i>
<i>Fredericton Fire Department</i>	<i>Royal Canadian Mounted Police "J" Division</i>
<i>Fredericton Police Service</i>	<i>Royal Canadian Mounted Police "L" Division</i>
<i>Halifax Regional 911</i>	<i>Royal Newfoundland Constabulary</i>
<i>Halifax Regional Fire Service</i>	<i>Saint John Police Force</i>
<i>Halifax Regional Police</i>	<i>Service de police de la Ville de Montréal</i>
<i>Ind Can Emergency Telecommunications</i>	<i>Service de protection des citoyens - Laval</i>
<i>Integrated Justice, Solicitor General</i>	<i>Simon Fraser University</i>
<i>International Association of Fire Chiefs</i>	<i>St. John's Regional Fire Department</i>
<i>International Joint Commission</i>	<i>Summerside EMO</i>
<i>London Police</i>	<i>Sureté du Québec</i>
<i>Metropolitan Toronto Police</i>	<i>Telus Mobility</i>
<i>Ministère de la sécurité publique - Québec</i>	<i>Vancouver Fire and Rescue Services</i>
<i>Miramichi Police Force</i>	<i>Vancouver Police Service</i>
<i>Montreal Fire Department</i>	<i>Ville de Montréal</i>
<i>Motorola</i>	<i>Waterloo Regional Police Department</i>
<i>N.B. Emergency Medical Services</i>	<i>Winnipeg Police Service</i>
<i>N.B. Policing Services</i>	

This report is the result of research undertaken by RBP Associates and L'ABBE Consulting Services under contract with Industry Canada. The comments herein are those of the authors themselves based on discussions with a large number of officials from the public safety community in Canada. They are not intended, in any way, to represent the views of Industry Canada.



Table of Contents

Foreword	
Executive Summary	i
1. Introduction	1
The National Public Safety Radiocommunications Conference	
2. Interoperability	4
2.1 Standards and Technology	
2.2 Spectrum	
2.3 Funding	
2.4 Coordination and Partnerships	
2.5 Defining Interoperability	
3. Canadian Public Safety Radiocommunications Project	9
4. Consultations	11
5. Framework for a New Organization	14
5.1 In Search of a Model	
5.2 Mission and Strategic Objectives	
5.3 Membership Structure	
5.4 Organizational Structure	
5.5 Funding	
5.6 Summary	
6. Next Steps.....	21
Appendix 1: Funding Sources for Communications and Information Sharing Equipment (U.S.)	22
Appendix 2: Request for Proposals	24
Appendix 3: Briefing Documents	30
Appendix 4: Summaries of Consultations	36
Appendix 5: Written Submissions	37
Appendix 6: Who Speaks for Public Safety in the U.S.?	70
References	73

Executive Summary

1. Introduction

The inability of our public safety officials to readily communicate with one another while on-the-scene during emergencies or disaster situations threatens the lives of all those who respond to such life threatening events as well as the lives of the public in general.

Public safety agencies grapple with a multitude of incompatible radio systems and congested frequency bands. The ability to readily communicate between agencies (i.e., interoperability) remains for the most part a daunting task due to a host of issues from spectrum shortages, incompatible standards and technologies, a lack of funding and a lack of liaison and coordination between all those involved.

Canada's law enforcement, fire and emergency medical response personnel depend on and deserve effective communications systems that allow them to do their jobs. The issue is too important to be ignored and too complicated for any one agency to solve.

While Industry Canada has a leadership role to play in fostering a better communications system for public safety, the underlying issues go beyond spectrum management and standards development.

The inherent complexities of issues like interoperability touch not only on safety and security matters but also on cross-border issues, federal-provincial relations, labour issues and Federal funding for provincial and municipal undertakings.

What is absent today among Canada's public safety community is a means of dealing strategically with communications issues. Ultimately this will require partnerships between the key front line user groups and government agencies at all three levels.

2. Interoperability

Interoperability is the ability of public safety agencies to talk to one another via radio systems – to exchange voice and/or data with one another on demand, in real time, when needed.

The interoperability challenge is multi-faceted. There are four basic reasons why public safety agencies cannot communicate with one another while on-the-scene:

- Standards and technology
- Spectrum
- Funding
- Coordination and partnerships

If public safety agencies are to achieve interoperability on large scale, the development of standards needs particular attention. Standardized systems provide the only practical route to large-scale interoperability.

Public safety radiocommunications systems today are distributed across multiple frequency bands with no universally available and affordable radio being able to operate across the entire range. None of these bands of spectrum are allocated specifically to public safety.

This scarcity of spectrum is a major barrier to achieving any high level of interoperability within any metropolitan area. The only possible band where some relief can be found over the next decade lies in a portion of the UHF band currently allocated to television broadcasting. However, broadcasters remain adamantly protective of spectrum allocated to UHF television broadcasting and oppose any move to co-sharing.

Funding is also a major obstacle to interoperability. One way of addressing this lies in the establishment of partnerships between agencies and jurisdictions where resources can be pooled. In addition, new funding mechanisms need to be developed through cooperative programs between different levels of government.

Whether on a national or local scale, any move to interoperability requires strong partnerships, coordinated planning and leadership.

The public safety community in Canada lacks the means for cohesive strategic planning and policy development in areas such as spectrum resource requirements, standards and funding.

3. Canadian Public Safety Radiocommunications Project

This report focuses on the requirement for coordination and partnerships. RBP Associates and L'ABBE Consulting Services have been asked by Industry Canada to develop recommendations that would significantly improve coordination efforts among Canada's public safety organizations.

In carrying out this research, the contractors adopted a three-phase approach beginning with an extensive schedule of face-to-face meetings with a large number of individuals representing public safety agencies across Canada. This work was followed by the development of conclusions and recommendations and the building of a consensus position among key agencies.

4. Consultations

An extensive consultation process was undertaken that focused on the question, **"Who speaks for public safety in Canada?"** Based on this process, the following observations were made:

- Access to spectrum resources is a major (and growing) problem for public safety agencies in Canada.
- Interoperability on a broad scale is seen as extremely difficult or even impossible to achieve.
- No single organization speaks for Canada's public safety community.
- Existing organizations are either not suited or are ill-equipped to resolve on-going issues.
- A task force approach is not sufficient to deal with public safety issues.
- Universal support exists for the creation of a strong high-level representative organization in Ottawa.

- The creation of such a new high-level organization would require a strong partnership with Government.

5. Framework for New Organization

From the extensive consultations undertaken and a careful analysis of the issues involved, the researchers conclude that the most effective and perhaps only way to achieve significant progress in the area of public safety radiocommunications is through the creation of a permanent high-level public safety organization in Ottawa.

Bringing all stakeholders together within some sort of cohesive responsive organization that can speak on behalf of its constituents on policy and regulatory matters in Ottawa is by any measure a difficult task. The building of such an organization will require leadership as well as a firm commitment from all the major players.

The U.S. seems to have an abundance of visible organizations speaking for the public safety community. These agencies are invariably well-funded; have professional resources at their disposal; are heavily involved in legislative matters; and, are supported financially by Federal agencies.

There are two basic models for any advocacy organization: broad-base membership and association of associations.

Given the very complex nature of public safety in Canada, the existence of several representative groupings and the need to move as quickly as possible, we tend to favour the "association of associations" model.

Out of necessity, we envisage a Board of Directors made up of senior officials at the highest authority level possible. Without this senior level commitment to the mission and objectives, an umbrella organization will not succeed.

The creation of a new organization will require seed funding that should be in the form of a Federal Government contract to an appropriate third party with a mandate to establish the organization within a specific time frame. Long-term funding will require a combination of revenue sources including membership dues, federal contribution and other sources.

6. Next Steps

To move forward, there has to be a clear recognition by the stakeholders that a major problem exists with Canada's public safety radiocommunications system and that this problem threatens the lives of Canadians as well as the lives of those engaged in law enforcement, fire fighting and emergency response.

The Deputy Minister of Industry Canada should convene a meeting of the most senior officials from the major public safety organizations to debate the findings of this study and to agree on a course of action for moving forward.

In advance of such a meeting, officials from Industry Canada should brief senior officials from other Federal Departments (e.g., Solicitor General, OCIPPEP, etc.) on the issues and the need for action.

1

Introduction

In September 1996, a report issued by the U.S. Public Safety Wireless Advisory Committee (PSWAC) stated:

".. unless immediate measures are taken to alleviate spectrum shortfall and promote interoperability, public safety will not be able to adequately discharge their obligation to protect life and property in a safe efficient and cost-effective manner."

Public safety agencies are grappling with a multitude of incompatible radio systems and congested frequency bands

Whether in the U.S. or in Canada, public safety agencies continue to grapple with a multitude of incompatible radio systems and congested frequency bands. The ability to readily communicate between agencies (i.e., interoperability¹) remains for the most part a daunting task due to a host of issues from spectrum shortages, incompatible standards and technologies, to a lack of funding and a lack of liaison and coordination between public safety agencies.

Yet, public perception is different. In an age where individuals can communicate at the press of a button through wireless technologies and the internet, most would find it difficult to believe that their public safety agencies in most cases cannot talk to one another. Indeed, in many cases, public safety officials cannot readily talk within their own agencies².

The inability of our public safety officials to readily communicate with one another while on-the-scene of emergencies or disaster situations threatens the lives of all those who respond to such life threatening events as well as the lives of the public in general.

The inability of our public safety officials to readily communicate with one another while on-the-scene of emergencies or disaster situations threatens the lives of all those who respond to such life threatening events as well as the lives of the public in general.

Nowhere was this failing more in evidence than in New York City on September 11, 2001. While police and firefighters fought to rescue survivors at the World Trade Center, command centres were getting reports from various quarters on the impending collapse of the twin towers. Orders to evacuate managed to reach most police officers. However, firefighters remained oblivious to the impending collapse because they were using a different radio system. As a result, communications of vital information was delayed and hundreds of firefighters, rescue workers and other emergency personnel lost their lives.

Canada has seen its own share of natural disasters from major floods in Manitoba and Lac St-Jean to the great ice storm of 1998. In each case critical public safety radiocommunications broke down because of incompatible and inadequate radiocommunications systems. To make up for the shortfall, commercial carriers worked around the clock distributing thousands of phones to emergency response crews in order to maintain communications.

Even in planning major events where safety and security are of prime concern, communicating through public safety radio systems is not possible. The recent G-8 summit in Kananaskis, Alberta in the Spring of 2002 is a prime example. In order to accommodate all police and security agencies for the event, a specially designed radio system was build at a cost of \$17 million.

¹ "Interoperability" is the ability of public safety agencies to talk to one another via radio communications systems – to exchange voice and/or data with one another on demand, in real time, when needed.

² For example, the RCMP utilizes fourteen different radio systems across Canada.

Canada's law enforcement, fire and emergency medical response personnel depend on and deserve effective communications systems that allow them to do their jobs

While Industry Canada has a leadership role to play in fostering a better communications system for public safety, the underlying issues go beyond spectrum management and standards development

Not only is radiocommunications a major and growing problem for the public safety community in Canada, there are few, if any, short term solutions. Spectrum bands used by public safety officials are generally shared with other mobile users and are chronically over-congested in most major centres. Recently, Industry Canada noted³:

- Existing allocations cannot accommodate the introduction of advanced applications: duplex voice, advanced high speed data, video;
- There exist no suitable spectrum alternatives to relieve the shortage in capacity.

Public safety and security are core functions of government. Protecting the people of Canada is an enormous responsibility and challenge for governments at all levels. Canada's law enforcement, fire and emergency medical response personnel depend on and deserve effective communications systems that allow them to do their jobs. The issue is too important to be ignored and too complicated for any one agency to solve.

While Industry Canada has a leadership role to play in fostering a better communications system for public safety, the underlying issues go beyond spectrum management and standards development. The inherent complexities of issues like interoperability touch not only on safety and security matters but also on cross-border issues, federal-provincial relations, labour issues and Federal funding for provincial and municipal undertakings.

What is absent among Canada's public safety community today is a means of dealing strategically with communications issues. Ultimately, resolving the problem will require partnerships between the key front line user groups and government agencies at all three levels.

The National Public Safety Radiocommunications Conference

In March 2002, the Radio Advisory Board of Canada (RABC) sponsored the National Public Safety Radiocommunications Conference that brought together various stakeholders to discuss the challenges of interoperability and standardization in public safety networks. The conference was also designed to initiate the development of a policy framework on potential solutions and recommendations.

The two-day conference featured presentations from a broad cross-section of the public safety community in Canada and the U.S. Industry Canada officials emphasized the need for greater involvement from public safety groups in policy development. It was stressed that input was needed public safety agencies on their particular system requirements. Ironically, those same public safety agencies have traditionally looked to the government for direction on what those requirements should be.

³ Industry Canada presentation to Ontario Association of Chiefs of Police Information and Technical Committee, February 2003.

Canada lacks a cohesive high-level organizational structure to represent the major public safety organizations

The conference identified a number of issues⁴ in relation to interoperability and public safety radiocommunications in general:

- Lack of functionality in public safety radiocommunications systems is due to:
 - Spectrum congestion and use of multiple bands
 - Different spectrum requirements in different areas (e.g. rural versus urban)
 - Outdated equipment
 - Incompatibility of equipment, technologies
 - Agencies operating on different bands
 - Some organizational rivalry and lack of co-operation
- Lack of interoperability is evident at all levels and is due to:
 - Loss/lack of provincial bands
 - Crowding of public safety bands in border areas & metro areas
 - Lack of organizational co-operation
 - No simple solution for full interoperability
 - Lack of consensus among stakeholders

There was general agreement among conference attendees on the need for standardization and interoperability of networks. In this regard, a vision of needs and functionality among Canadian stakeholders was seen as a pre-requisite to developing common requirements. Leadership was needed from the key stakeholders.

Two overriding conclusions were drawn from the conference:

1. Current deficiencies in wireless interoperability put the general public, as well as public safety officials, at significant risk. Without coordinated efforts, jurisdictions around the country will continue to develop communications systems in isolation without regard to standardization, possible spectrum developments, and interoperability initiatives.
2. Canada lacks a cohesive high-level organizational structure to represent the major public safety organizations (police, ambulance, fire department and emergency response). Such an organization is deemed essential in coordinating discussion on key issues such as interoperability and would provide unified and consistent representations to Government on the needs of public safety organizations in the area of radiocommunications.

As a follow up to this conference, Industry Canada commissioned the current research.

⁴ See "Summary Report on Conference Issues and Potential Scenarios", PWC Consulting.

2

The Interoperability Challenge

Interoperability is the ability of public safety agencies to talk to one another via radio systems – to exchange voice and/or data with one another on demand, in real time, when needed

Interoperability is the ability of public safety agencies to talk to one another via radio communications systems – to exchange voice and/or data with one another on demand, in real time, when needed⁵.

Events such as those of September 11, 2001 have raised awareness of critical shortcomings in emergency response during times of crisis including the lack of interoperability between radio systems. In the U.S., expanding mission requirements and increased security necessitate greater capability, coverage, and interoperability for wireless systems. Presidential and Homeland Security interests have raised the priority of these issues and is serving as a catalyst for action. By extension, cross border interoperability requirements have also become a serious issue.

As illustrated in **Figure 1**, the interoperability challenge is multi-faceted. There are four basic reasons why public safety agencies cannot communicate with one another on-the-scene.

If public safety is ever to achieve interoperability on a large scale, the development of standards needs particular attention

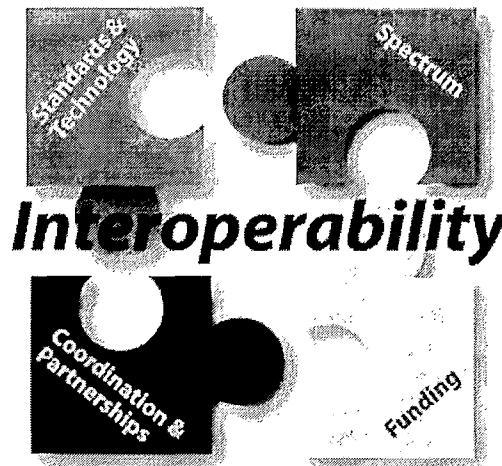


Figure 1: The Interoperability Challenge

2.1 Standards & Technology

Different agencies and jurisdictions use different equipment and different radio frequencies that cannot communicate with one another. Radio systems are usually at different stages of their life cycle. Equipment such as towers, control and dispatch systems, handheld and mobile radios can be anywhere from 20 to 40 years old in some jurisdictions.

⁵ As defined by the U.S. National Task Force on Interoperability.

If public safety agencies are ever to achieve interoperability on a large scale, the development of standards needs particular attention. Recent documents prepared by Ted Campbell^{6,7} deal extensively with the development of standards in the context of public safety interoperability. As Campbell rightly points out, interoperability, within and between systems, can be achieved in either of two ways, by using:

1. Common systems; or
2. Standardized systems.

While common systems can make sense within a given agency or among several agencies operating within a given jurisdiction, they do not necessarily contribute to strengthening the overall system. While several jurisdictions⁸ in Canada have implemented some level of interoperability through the use of a common system, the inherent shortcoming of these systems is their inability to communicate with neighboring jurisdictions that, in many cases, are likely to be moving towards a different common system thereby perpetuating the problem. Campbell goes on to point out that:

*“Standardized systems provide the only practical route to interoperability. Interoperability through standardized systems requires a set or, perhaps, sets of standards which can be called up by operational requirements managers when they decide to procure new systems. The standards should **guarantee** interoperability between systems and within systems. “*

The standards should guarantee interoperability between systems and within systems

Campbell identifies six steps in accomplishing system interoperability:

1. Identification of the operational requirements;
2. Identification of the elements requiring standardization in order to achieve the required levels of interoperability;
3. Development of the necessary standards;
4. Approval of the standards;
5. Ratification of the standards; and
6. Implementation of the standards.

Campbell recommends that these steps can best be accomplished if they are led by a small, independent, publicly funded – at arm’s length from vendors – agency or bureau which will do steps 1 and 2, delegate step 3 to a competent standards writing body, such as the Radio Advisory Board of Canada, do step 4 and then manage steps 5 and 6.

While a protracted discussion on the standardization approach goes beyond the scope of this report and indeed the mandate of this research, we find Campbell’s arguments compelling. As we discuss in Section 5 of this report, a new high-level organization could have, as part of its mandate and objectives, to direct the standardization drive for public safety radiocommunications in Canada.

⁶ Interoperability of Public Safety Radio Systems, Ted Campbell, Radio Advisory Board of Canada, April 2002.

⁷ Practical Interoperability, Ted Campbell, February 10, 2003. (See Appendix 5)

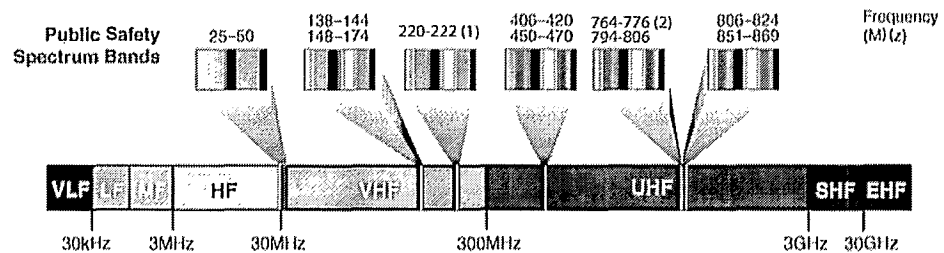
⁸ There are several examples of interoperability initiatives in Canada using a common system approach including E-Comm in lower mainland BC and more recently in the province of Québec where plans have been announced for a province-wide VHF “SmartZone” system. Other entities such as the Durham Regional Police Services use the facilities of commercial carriers (Telus iDEN system).

2.2 Spectrum

Public safety agencies started out using spectrum in the lower VHF band. As those bands became more and more congested and as technology developed, public safety entities were granted spectrum to allow radiocommunications operations in increasingly higher bands.

As a result of this evolutionary process, public safety radiocommunications systems today are distributed across multiple frequency bands from VHF (136-174 MHz) to UHF (806-824/851-869 MHz), with no universally available and affordable radio being able to operate across the entire range. See **Figure 2**.

Public safety radiocommunications systems today are distributed across multiple frequency bands with no universally available and affordable radio being able to operate across the entire range



(1) In the US, band is allocated for land mobile. In Canada, allocated to Radio Amateur use.

(2) In the US, additional spectrum bands (764-776 MHz and 794-806 MHz) have been allocated for public safety use. In Canada, consultations have been done.

There is no spectrum dedicated specifically to public safety

Figure 2: Public Safety Spectrum Bands

A main problem is that none of this spectrum - with the exception of 821-824 MHz - is dedicated specifically to public safety. The bands are shared with other spectrum users, and there is intense competition to access an ever dwindling resource. Existing allocations cannot accommodate the introduction of advanced applications such as duplex voice, advanced high speed data and video, and there is no suitable spectrum alternatives to relieve the shortage in capacity⁹.

This scarcity of spectrum is a major barrier to achieving any high level of interoperability within any metropolitan area since it invariably involves a great deal of reallocation and migration for users. Even where interoperability has been implemented to deal with everyday safety and emergency requirements¹⁰, there is insufficient capacity to deal with communications requirements in times of disaster.

The only possible band where some relief can be found over the next decade lies in a portion of the UHF band currently allocated to television broadcasting. In the U.S., the FCC has already stated its intention to reallocate the 746-806 MHz band for mobile service with the portions 764-776 and 794-806 MHz specifically designated for public safety. See **Figure 3**.

⁹ "Radio Frequency Spectrum and Public Safety", Industry Canada presentation to the Ontario Association of Chiefs of Police Information and Technical Committee, February 2003.

¹⁰ E-Comm is a good example of a major initiative in Interoperability in lower mainland BC.

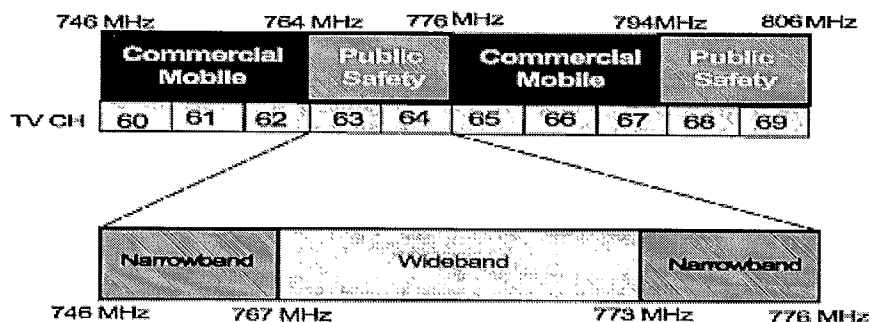


Figure 3: 700 MHz U.S. Allocation

Broadcasters in the U.S. are required to return their analog spectrum in the 700 MHz band by the end of 2006 (or when the penetration rate of digital TV reaches 85%)¹¹.

In June 2001, Industry Canada issued a proposal to introduce Mobile Service on a co-primary basis with the Broadcasting Service in the Band 746-806 MHz. There were 27 responses received from the commercial mobile community, public safety and from broadcast interests. The public safety community generally supported the proposed changes and called on Industry Canada to harmonize such allocations with those proposed in the U.S. On the other hand broadcast interests remain adamantly protective¹² of spectrum allocated to UHF television broadcasting, insisting that no mobile licences be granted until the digital TV implementation plan is complete. At the current rate of implementation, this will likely take at least a decade.

2.3 Funding

In any jurisdiction, funding to upgrade or replace expensive communications equipment is always problematic. Public safety officials are well-aware of the difficulties in getting funding for patrol cars, fire trucks and ambulances. When it comes to complex radio systems, the need to upgrade – let alone for interoperability – is often misunderstood. These are less visible than other capital investments and are often difficult to explain and justify.

Attempting any sort of interoperability across different jurisdictions is particularly problematic since different communities or agencies have different funding schedules and budget priorities. Generally, public safety agencies have developed their communications systems based on their own needs with little or no regard for the communications requirements of other agencies - in particular those of surrounding jurisdictions.

Funding is a major obstacle to moving towards interoperability. Some solutions to the funding problem lie in the establishment of partnerships between agencies and jurisdictions where resources can be pooled. Other solutions will require a better understanding on the part of government officials on the need for new innovative funding mechanisms.

Broadcasters remain adamantly protective of spectrum allocated to UHF television broadcasting

Funding is a major obstacle to interoperability

New funding mechanisms need to be developed through cooperative programs between different levels of government

¹¹ U.S. Broadcasters have been aggressively battling this requirement.

¹² Comments by the Canadian Association of Broadcasters in response to Gazette Notice DGTP-004-01, September 24, 2001

Any move to interoperability whether on a national or local scale requires strong partnerships, coordinated planning and leadership

Often the main reason public safety agencies cannot communicate with one another on a tactical level is that they don't communicate on strategic level

New funding mechanisms need to be developed through cooperative programs between different levels of government. In the U.S., through major efforts by groups such as the Association of Public Safety Communications Officials (APCO International), the International Association of Police Chiefs (IAPC) and the International Association of Fire Chiefs (IAFC), there has been significant progress in shaping emerging legislation to fund interoperability through Federal programs. **Appendix 1** lists a number of existing Federal Programs in the U.S. that provide funding for upgrading public safety radiocommunications systems.

2.4 Coordination and Partnerships

Any move to interoperability whether on a national or local scale requires strong partnerships, coordinated planning and leadership.

On a national scale, the main barrier to interoperability is the lack of cohesive strategic planning and policy development in areas such as spectrum resource requirements, standards and funding. Without a serious commitment among Canada's major public safety agencies to deal with the coordination issue, there can be no significant progress in improving radiocommunications over the long term.

At the local level, building cooperation between different sectors or jurisdictions is not a simple matter. The culture of individual organizations along with human factors are often substantial obstacles as agencies are naturally reluctant and opposed to giving up management and control of their communications systems.

Often the main reason public safety agencies cannot communicate with one another on a tactical level is that they don't communicate on a strategic level.

2.5 Defining Interoperability

An overriding question concerning interoperability deals with the scope of its application. In other words what level and type of interoperability is needed? The challenges that are highlighted above are as applicable to a large scale approach to interoperability as they are to a local initiative.

As discussed in section 2.3 under Standards and Technology, there are a number of examples in Canada where some level of interoperability has been achieved through the use of common systems (including commercial ones) within a given geographical area. While it can be argued that this approach at the local level is sufficient to meet the radiocommunications needs of public safety agencies, there is another school of thought – as implied earlier from comments by Campbell - that real progress in public safety radiocommunications lies in a cohesive planning exercise for large-scale interoperability leading to the development, adoption and ratification of standards in conjunction with spectrum resource planning.

Dealing with this overriding question requires considerable debate within the public safety community. As is suggested later in this report under "Framework for a New Organization", clearly defining the long-term needs and goals for public safety radiocommunications, including the level of interoperability, is one of the main priorities of a possible new representative organization for public safety in Canada.

3

Canadian Public Safety Radiocommunications Project

As was discussed in the previous section, the interoperability challenge is multi-faceted where spectrum, standards, funding and coordination are all seen as barriers to progress. As illustrated in **Figure 4**, this research focuses on the coordination & partnerships issue.

This research focuses on the coordination & partnerships issue



Figure 4: Focus of Current Research

On July 18, 2002, Industry Canada issued a Request for Proposal (see Terms of Reference **Appendix 2**) to develop recommendations that would

“significantly improve coordination efforts among Canada’s public safety organizations to identify and discuss the issues in radiocommunications and ways to address those issues; and identify different options on next steps and possible means of funding”.

RBP Associates and L’ABBE Consulting Services were subsequently awarded a contract in December 2002 to undertake this work.

This report by RBP Associates and L’ABBE Consulting Services deals with recommendations to significantly improve coordination efforts among Canada’s public safety organizations

Methodology

The work of the contractors involved a three-phase approach:

Preparatory

The first phase of work involved a review of key material including the PriceWaterhouseCoopers Consulting (PWCC) Report of the National Conference on Public Safety and other comments received by RABC, from the Public Safety Community on the Conference and on the Report. Other material, in particular dealing with interoperability was also reviewed.

A list of individuals and agencies to interview along with a package of material (i.e., slide presentation) were developed (**Appendix 3**). The presentation

identified the main issues and outlined several organizational options for consideration.

This material including the list of stakeholders, the presentation and questionnaire was subsequently discussed with officials of Industry Canada. From these discussions and consultations, the material was finalized.

A new web site www.pscm.ca was created to encourage participation and promote the sharing of ideas.

Consultations

The contractors held face-to-face meetings with a large number of individuals¹³ from public safety agencies. These meetings were conducted in various parts of Canada with individuals at varying levels of authority. A package of information was left behind for their further consideration. The information package was also posted on the pscm.ca website, along with comments and input received.

The results of these interviews/consultations were analyzed. From this, a number of conclusions along with key recommendations were developed as was a possible framework for moving forward. An interim report was prepared and presented to Industry Canada outlining the results of consultations and recommended approaches.

Consensus Building

Draft conclusions and recommendations were posted on the pscm.ca website to solicit final comments from members of the public safety community. From these, final conclusion and recommendations were developed and this final report was drafted.

A roundtable meeting with senior officials of key public safety agencies is being planned to forge agreement on these conclusions and to foster agreement on the next steps. A date for this meeting has yet to be set.

¹³ The contractors have met with 134 individuals from 94 different agencies from across Canada. (See Appendix 4)

4

Consultations

An extensive consultation process involving members of the public safety community across Canada was initiated in early January 2003. During the course of the project, the contractors met more than one hundred individuals representing over ninety agencies directly involved in public safety in Canada.

These meetings were intended to gather information on the state of radiocommunications among the various public safety agencies in Canada and to discuss possible approaches to improve coordination. The concept of creating a new representative organization as discussed in the PWC report was also raised to gauge the level of interest and support.

For each meeting, a presentation was made (see **Appendix 3**) following which discussions were held on key issues such as interoperability, spectrum, funding and licence fees as well as on the basic question of "**Who Speaks for Public Safety in Canada?**"

A general summary of the meetings is provided in **Appendix 4**.

In addition to information gathered through these face-to-face meetings, officials were invited to provide written submissions. The submissions received are provided in **Appendix 5** and are also available at the www.pscm.ca website.

Following careful analysis of comments received both through face-to-face meetings and written submission, the authors offer the following observations:

Observation #1: Access to spectrum resources is a major (and growing) problem for public safety agencies in Canada.

Most organizations expressed considerable frustration in getting access to needed spectrum resources. There was a recurring theme that public safety agencies had little or no priority status with Industry Canada in accessing channels. Access to spectrum was even deemed to be a significant problem in remote communities such as those in Newfoundland.

With the need to introduce new advanced communications systems, access to spectrum is seen as a growing problem.

Even for organizations such as Emergency Communications for Southwest British Columbia (E-COMM), where significant progress has been made to establish interoperability between emergency response agencies in lower mainland BC.

Observation # 2: Interoperability on a broad scale is seen as extremely difficult or even impossible to achieve.

While there was general agreement on the importance of moving towards interoperability, there was also a sense that unless some major changes occur, there was little hope for achieving such interoperability on a broad scale.

In addition to requiring a great deal more spectrum, the main barrier to achieving interoperability was seen to be a chronic lack of funding and funding

Access to spectrum resources is a major problem for public safety agencies in Canada

Interoperability on a broad scale is seen as extremely difficult or even impossible to achieve

alternatives¹⁴ for radio systems. From a financial management and procurement point of view, radio communications requirements are generally seen as very low on the list of funding priorities.

Observation #3: No single organization speaks for the public safety community in Canada.

The question of "Who speaks for public safety in Canada?" was the subject of considerable discussion.

In this regard, the role and function of the Association of Public Safety Communications Officials (APCO) was raised by the researchers at every meeting. Among senior officials, APCO is effectively invisible. In virtually all cases, senior officials from police, fire or emergency services were either completely unaware of the existence of APCO or were uncertain as to its role. Among officials directly responsible for communications, there was awareness of the role and work of APCO. This was particularly the case where officials had participated in the organization in some senior capacity. Several respondents suggested that APCO was the right organization to undertake a high-level advocacy function in Ottawa.

Among other organizations, the Canadian Association of Chiefs of Police (CACP) has significant respect in representing the country's police forces. CACP has an office in Ottawa with permanent staff. It develops policies and regularly speaks on legislative and regulatory issues affecting law-enforcement or legal issues in general.

Similarly, the Canadian Association of Fire Chiefs (CAFC) has a small office in Ottawa and provides a limited advocacy role on behalf of fire fighters.

While both CACP and CAFC do speak on behalf of their respective communities, they cannot speak on behalf of the public safety community as a whole.

Observation #4: Existing organizations are not suited or are ill-equipped to resolve on-going issues.

The researchers met with several organizations to discuss possible liaison and advocacy roles on behalf of public safety agencies in Canada.

The Canadian Wireless Telecommunications Association (CWTA) represents commercial wireless carrier interests in Canada. Two of its members, Telus Mobility and Bell Mobility, provide services to the public safety community. In discussions, officials emphasized that CWTA would be in a conflict of interest position if it were to represent the public safety community and therefore is not suited to undertake any advocacy role on its behalf.

The Radio Advisory Board of Canada (RABC) represents most sectors of the radiocommunications business in Canada and provides the Government of Canada with broadly based advice regarding the management and use of the radio frequency spectrum. While RABC would likely be a key player in

¹⁴ In the U.S., there are a number of Federal programs that provide grants to assist public safety agencies to implement advanced radiocommunications systems (see **Appendix 1**). Similar grants were seen as essential in moving towards an interoperability solution in Canada.

developing standards and spectrum plans affecting public safety, it cannot undertake an advocacy role on behalf of any one of its members.

In its current state, APCO is ill-equipped to undertake a high-level advocacy role on behalf of the public safety community. APCO lacks visibility and is seen by most respondents as weak and ineffective in dealing with public policy issues.

While organizations such as CACP and CAFC could undertake an enhanced advocacy role in relation to spectrum requirements on behalf of their respective sectors, they are unlikely to undertake such a role on behalf of the public safety community as a whole.

Observation #5: A task force approach is not sufficient to deal with public safety issues.

A task force approach is not sufficient to deal with public safety issues

The possibility of creating a short term task force with a specific mandate (e.g., interoperability) was discussed as a possible approach to resolving existing problems. In the U.S., for example, the task force approach has been used to develop guidelines for interoperability.

In general, dealing with public safety issues such as the lack of spectrum resources and the need for interoperability was seen as requiring a permanent organization with "sustainability".

Observation #6: There is universal support for the creation of a strong high-level representative organization in Ottawa.

There is universal support for the creation of a strong high-level representative organization in Ottawa

Senior officials representing public safety agencies in Canada generally view communications problems as the result of a lack of effective representation for the public safety community in Ottawa and a lack of collective strategic planning for spectrum resources by the public safety community.

There is universal support in moving towards the creation a new high-level organization to represent Canada's public safety agencies. Such an agency, based in Ottawa, would be strategic and policy oriented as well as politically connected. While the organization would focus mainly on radiocommunications issues, it would also play an overall advocacy role in fostering greater visibility and respect for public safety.

Observation #7: The creation of a new high-level organization requires a strong partnership with Government.

The creation of a new high-level organization requires a strong partnership with Government

The development of improved communications and interoperability for public safety should be seen as a major strategic issue for all levels of Government. While significant efforts to enhance the safety and security of Canadians are being made through Industry Canada's Emergency Telecommunications Organizations, the Office of Critical Infrastructure Protection and Emergency Preparedness (OC�PEP) and other government initiatives, there has been little attention to date on the critical need for reliable on-site communications.

Without a strong partnership approach between government agencies and the public safety community, there will likely be little progress.

5

Framework for a New Organization

The only way to achieve any significant progress is through the creation of a permanent high-level public safety organization in Ottawa

The building of the organization will require leadership and commitment from the major players

From the extensive consultations undertaken and a careful analysis of the issues involved, the authors conclude that the most effective way and perhaps the only way to achieve any significant progress in the area of public safety radiocommunications is through the creation of a permanent high-level public safety organization in Ottawa.

Problems with radiocommunications in public safety are to a large extent the result of a complete absence of cohesive planning and advocacy on behalf of the community as a whole. The public safety community needs to create visibility in Ottawa and it needs to educate policy makers and the general public on its crucial role in society. It can only achieve this through a well-respected representative body that will carry its message.

In relation to spectrum and interoperability issues, such an organization would be mandated to undertake long term strategic planning on behalf of the public safety community and to define the long-term radiocommunications needs and goals for public safety radiocommunications in Canada including defining the needed level of interoperability.

The organization would facilitate the coordination of cross-border communications issues with key public safety organizations in the U.S. It would also play a leadership role in the development of interoperability standards in cooperation with U.S. agencies and other entities such as the Radio Advisory Board of Canada.

While the need for a strong representative organization has a great deal of support among the public safety community, building such a new organization is not easy. The public safety community in Canada is extremely diverse with a number of sectors (police, fire, ambulance). There are hundreds of individual entities from large police forces such as the RCMP to very small volunteer fire departments. These entities are funded and governed at all three levels of government. Bringing this community of interest together in some sort of cohesive responsive organization that would speak on behalf of its constituents on policy and regulatory matters in Ottawa is by any measure a difficult task.

The building of such an organization will require the leadership and commitment of the major players.

5.1 In Search of a Model

Representative organizations in Ottawa are as varied as the memberships they serve. Those that deal primarily with communications issues vary from

The U.S. seems to have an abundance of visible organizations speaking for the public safety community

Virtually all U.S. public safety organizations are supported financially by Federal agencies

associations of individuals¹⁵, associations of corporate entities¹⁶ to associations of associations¹⁷.

Certain advantages as well as disadvantages are inherent to each type of organization. The preference on a particular model ultimately depends on the mission and objective of the organization.

5.1.1 Who Speaks for Public Safety in the U.S.?

In searching for an appropriate framework for a new public safety organization in Canada, we have undertaken a cursory examination of U.S. organizations that speak for public safety (See **Appendix 6**). Unlike Canada, which doesn't have any visible organization speaking for the public safety community, the U.S. seems to have an abundance of such groups. While some of these organizations (e.g., APCO Intl.) have a broad membership base, others are constituted as associations of associations (e.g., National Public Safety Telecommunications Council). For the most part, these organizations all share the following characteristics:

- They are well-funded;
- They have professional resources at their disposal;
- They are heavily involved in legislative matters; and
- They are supported financially by Federal agencies.

5.2 Mission and Strategic Objectives

Early in the process, agreement needs to be reached on the organization's mission and strategic objectives. This is critical in moving forward since the organization's governance structure will ultimately flow from this.

A possible mission statement would be:

The voice of Public Safety in Canada enabling the progress of its members for the benefit, safety, security and well being of all Canadians

Similarly a list of strategic objectives could include:

- **To promote a better understanding and appreciation of the critical role played by public safety agencies in our communities;**
- **To develop political and public policy influence commensurate with the economic and social importance of public safety;**

¹⁵ Organizations such as the Radio Amateurs of Canada (RAC) and the Association of Public Safety Communications Officials (APCO) are organizations of individuals who share a common interest. While such organizations have large constituencies, they usually lack resources and "muscle" to be effective at political levels.

¹⁶ Organizations such as the Canadian Wireless Telecommunications Association (CWTA), the Canadian Association of Broadcasters (CAB) and the Canadian Cable Television Association (CCTA) are examples of associations representing corporate entities. These types of organizations are usually well-funded and undertake extensive lobbying on behalf of their members.

¹⁷ The Radio Advisory Board of Canada (RABC) is an example of an association of associations. While it has limited resources, it offers, through an elaborate committee structure, valued advice to Industry Canada on spectrum related issues.

- To ensure timely access to needed spectrum resources to maintain critical communications in times of emergency and disaster relief;
- To achieve a high level of interoperability within and between public safety agencies;
- To secure new sources of funding for public safety agencies.

5.3 Membership Structure

There are two basic models for any advocacy organization: broad-base membership and association of associations

There are two basic models for any advocacy organization:

1. Broad-base membership
2. Association of associations

Broad-base organization

Most successful advocacy organizations depend on individual corporate memberships¹⁸ to represent the interest of a particular sector. This is the case for organizations such as the Canadian Wireless Telecommunications Association, the Canadian Association of Broadcasters and the Canadian Cable Television Association. Governance in these organizations is in the hands of a Board of Directors who are elected by the broad membership. In addition, groupings of members can be formed to represent a particular sector or regions and can have voting status on the Board.

Given the nature of public safety in Canada, building a broad-base organization would be a difficult and complex undertaking

In the case of public safety, a similar broad-base organization could be established. However, given the nature of public safety in Canada, this would likely be a difficult and complex undertaking.

Under such an approach, individual police, fire and ambulance services could be urged to join the organization and help fund its operation. Because of the large number of potential members, this would require the establishment of regional or provincial organizations. The governance model involving voting rights, elections to the board, etc. is inherently complex and time-consuming to administer.

In addition to individual memberships, certain groups like E-Comm, CACP and CAFC would likely need to be accommodated.

Association of Associations

The best example for an "association of associations" model is the Radio Advisory Board of Canada (RABC). RABC's membership¹⁹ consists of associations that represent a particular sector that uses spectrum. RABC depends on its various member organizations to formulate policy in response to Industry Canada spectrum and telecommunications policy documents. These position documents are the subject of member voting before they are submitted to Industry Canada. Because RABC is not a lobby organization, its structure and

¹⁸ There are organizations based on individual memberships (e.g., APCO). This is the case where individuals share a common profession (e.g., communications professionals). These organizations are closer in concept to professional associations or even unions that work for the well-being or advancement of the profession. The researchers do not view this model as appropriate for a high-level advocacy body to represent public safety in Canada.

¹⁹ In addition to various associations representing spectrum users, RABC also has a number of commercial carriers as members. While this is not in accordance with RABC's by-laws, the individual corporate memberships have been grandfathered.

membership model work well. Its role is simply to provide "advice" to government.

Discussion on appropriate model

As stated earlier, successful lobby organizations seem to be structured on the broad-base model where individual entities can participate in the formulation of policy and seek to influence the direction of the organization. A significant advantage of a broad membership base is that funding for the organization can be distributed among a large number of entities. Assuming that an equitable dues structure between large and small entities can be agreed on, a stable long-term funding formula for the organization can be implemented. Nevertheless, as stated earlier, such an organization with a large and divergent membership requires complex governance and administration.

In examining existing associations, we find that there is rarely a pure broad-base organization of individual entities or a pure association-of-associations approach. While this mixture of individual entities and groupings within the same governance structure does work to some degree (e.g., RABC), it usually results in conflict and on occasion can lead to severe problems.

Given the very complex nature of public safety in Canada, the existence of several representative groupings such as CACP, CAFC, E-COMM and the need to move as quickly as possible, the authors tend to favour the "association of associations" model.

CACP and CAFC already have regionalized structures that would provide some essential contact with members of the public safety community throughout the country. Other stakeholders such as ambulance and other emergency services could be represented through regional or provincial government agencies.

In addition to existing associations, membership should be considered for specific entities whose importance for a number of reasons would require their direct participation in the organization. The RCMP, OPP, the Sureté du Québec and large fire departments could hold direct membership. Others, including provincial health agencies, could represent ambulance and emergency services. In addition, Federal agencies involved in customs and immigration, DND, coast guard, etc. should also be considered for membership.

While a key advantage of the "association of associations" model is the relatively simple administrative and governance structures, its major drawback is in funding. With only a handful of members, some of whom have very limited financial resources, funding becomes a major problem. The funding issue is examined in greater detail later in this document.

*The
"association of
associations"
model is the
preferred
approach*

5.4 Organizational Structure

A simple organizational structure is illustrated in **Figure 5**.

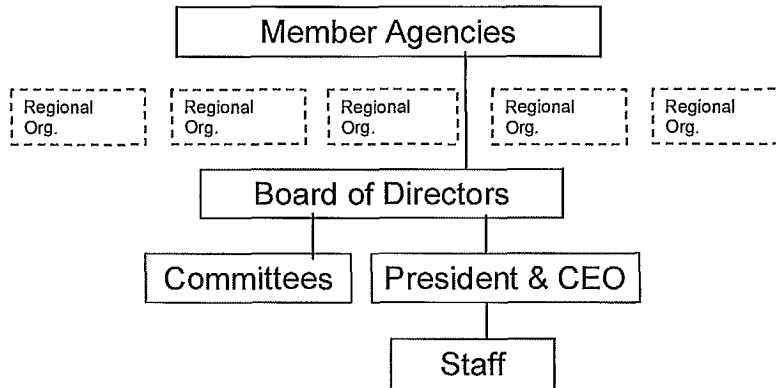


Figure 5: Organizational Structure

5.4.1 Member Agencies

As discussed previously, we recommend an "association of associations" model with key public safety organizations taking a lead role.

A category of "Affiliate" members could also be created to accommodate equipment manufacturers, commercial carriers and interested parties who would likely want to be involved in any public safety agency²⁰.

Without senior level commitment to the mission and objectives, the organization will not succeed

5.4.2 Board of Directors

Under the proposed model, and given the limited number of "members" envisaged it would be logical for each organization to actively participate on the Board of Directors with full voting rights. Supporting organizations would be responsible for electing or appointing "their" representative(s) to the Board.

Critical to the success of the new organization will be the level of authority of individual members of the Board. Out of necessity, we envisage a Board of Directors made up of senior officials at the highest level possible. Without this senior level commitment to the mission and objectives, the organization will simply not succeed.

5.4.2 Committees

Committees would serve an essential and important role within the overall organization. Established by the Board of Directors, committees would report to the Board and could deal with the following areas:

Spectrum

²⁰ While we found support among public safety officials in providing a role for affiliate members within a new organization, there would be a great deal of resistance to providing such affiliates with any form of voting status. The new organization is clearly seen as one representing public safety first responders.

Interoperability
 Funding
 Public Relations & Communications
 Other Issues

The importance of committees cannot be overstated. Committees work most effectively when they are supported by professional staff and when necessary funding is made available to support their work. Of particular importance for this organization would be those committees dealing with spectrum and technology issues²¹.

The organization will require a professional staff including experts in spectrum and standards along with public relations professionals

5.4.3 Staff

As in other organizations, the staff would be headed by a CEO reporting to the Board of Directors. We believe the appointment of a senior executive with key government contacts would be essential to lead this new organization.

The organization would also require the expertise of a professional staff including experts in spectrum and standards along with public relations professionals all of whom would be responsible for supporting the work of the various committees.

5.5 Funding

Funding is a major issue and ultimately will require a great deal of discussion.

5.5.1 Seed Funding

Seed funding should be in the form of a Federal Government contract to an appropriate third party with a mandate to establish the organization within a specific time frame

A decision by key stakeholders to proceed with the creation of a representative public safety organization would require that seed funding to be made available immediately. This funding would allow an interim period for the establishment of a working Board, the hiring of key staff, the establishment of appropriate governance and administrative functions.

We suggest that this seed funding should be in the form of a Federal Government contract to an appropriate third party which would be given the mandate to establish the organization within a specific time frame.

5.5.2 Long-term Funding

We believe a new organization could be fully operational within six months once a decision to move forward has been made. While a long-term funding formula for the organization will undoubtedly be the subject of considerable debate, we offer the following:

- Under the proposed "association of associations" model, the actual number of member public safety agencies would be very small. What's more,

²¹ APCO Canada has generally assumed the role of representing the public safety community in regard to spectrum and standards issues. It would seem logical for APCO to continue this role within a new high level organization and essentially take on the role of the appropriate committees. It could be argued that APCO Canada as an organization of volunteers has to-date had limited success in its advocacy role. This is due in large measure to its very limited financial resources and the lack of professional staff to support its activities. Under the wings of a new high-level organization, these constraints would disappear.

associations by nature have very limited budgets and would likely have a great deal of difficulty providing funding to another organization.

- Nevertheless, we believe success will depend on some level of funding being made available from the member agencies.
- Under a partnership arrangement, we view on-going funding from the Federal Government as essential to success. As we've noted earlier, funding for public safety organizations in the U.S. is made available through several Federal Government agencies including Treasury, Commerce and Justice.
- To undertake the work involved and to be effective, such an organization requires as a minimum on-going funding of at least \$1 million per year.

In essence, a successful organization would depend on several sources of funding including membership dues, government support and possibly other sources such as publications, sponsorships and events.

5.6 Summary

Among senior officials representing public safety organizations across Canada, we have found strong and overwhelming support for the creation of an effective organization to represent their interests in Ottawa. As we've stated, we believe the creation of such an organization through a partnership arrangement with Government is essential if real progress is to be made for public safety radiocommunications in Canada. Furthermore, we also suggest that in order to be successful, the organization will need to be structured carefully and we have proposed a framework with the following characteristics:

- An association of associations model with direct participation from large entities;
- A mission and objectives focused on radiocommunications as well as promoting the key role of public safety;
- A high-level Board of Directors to govern the organization;
- A committee structure to tackle the issues;
- A senior CEO and professional staff;
- Significant funding through membership dues and a partnership arrangement with key Federal agencies.

6

Next Steps

To move forward, there has to be a clear recognition by the stakeholders that a major problem exists with Canada's public safety radiocommunications system and that this problem threatens the lives of Canadians as well as those who put their lives at stake in law enforcement, fire fighting and emergency response.

Not only are current systems incapable of adequately handling some of the day-to-day requirements such as a major fire, systems cannot come close to handling major disasters whether natural or man-made (i.e., terrorist attack). Because of the events that occurred on September 11, 2001, the U.S. is now well-aware of the critical and chronic deficiencies of public safety radiocommunications and is prepared to invest significant resources to find solutions. Such awareness is still missing in Canada, particularly in Ottawa..

As noted previously, we believe the underlying issues related to public safety radiocommunications interoperability go beyond spectrum management and standards development. The main barriers relate to a lack of cohesiveness and planning on the part of the public safety community as well as to a chronic need to access new funding sources for radio systems.

We believe Industry Canada must continue its leadership role in bringing this problem to light and in helping to find workable solutions.

Recommendations:

1. As a first order of priority, we believe the Deputy Minister of Industry Canada should convene a meeting of the most senior officials from the major public safety organizations to debate the findings of this study and to agree on a course of action for moving forward.

The meeting should be expected to achieve agreement on how to deal with this issue including a decision on the possible formation of a new high-level organization to represent Canada's public safety community as well as on funding options to sustain it.

2. In advance of such a meeting, officials from Industry Canada should brief senior officials from other Federal Departments (e.g., Solicitor General, OCIPEP, etc.) on the issues and the need for action. These other Departments should also be invited to attend and participate in such a meeting.
3. Ultimately, if a decision is reached for the creation of a new organization, seed funding should be made available through a government contract.

A contractor would be charged with building the new organization within a specific time frame. This would involve the recruitment of members, the establishment of a working Board, the development of the governance and administrative structures and the hiring of staff.

Industry Canada should convene a meeting of the most senior officials from the major public safety organizations

Officials from Industry Canada should brief senior officials from other Federal Departments on the issues and the need for action

Appendix 1

Funding Sources for Communications and Information Sharing Equipment (U.S.)

Bureau of Justice Assistance Local Law Enforcement Block Grants (LLEBG)

Funds from the LLEBG program may be used for procuring equipment, technology, and other material directly related to basic law enforcement functions.

Making Officer Redeployment Effective (COPS MORE) Grants

This grant program, provided through the Community Oriented Policing Services (COPS) Office, is designed to expand the time available for community policing by current law enforcement officers through the funding of technology, equipment, and support personnel.

Office for Domestic Preparedness Equipment Grant Program

The goal of the ODP Equipment Grant Program is to provide funding to enhance the capacity of state and local jurisdictions to respond to, and mitigate the consequences of, incidents of domestic terrorism involving the use of a Weapon of Mass Destruction (WMD). Communications equipment is included on the authorized equipment purchase lists for these ODP grants.

Office of Justice Programs (OJP) Information Technology Initiatives

The OJP Information Technology Initiatives web site offers access to timely and useful information on the information sharing process, initiatives, and technological developments. The funding section of this site provides information on both federal and private funding sources, examples of innovative funding ideas, and tips on researching funding legislation.

Office of National Drug Control Policy, Counterdrug Technology Assessment Center (CTAC) Technology Transfer Program

The CTAC Technology Transfer Program assists State and local law enforcement agencies in obtaining the necessary equipment and training for counterdrug deployments and operations.

Technology Opportunities Program (TOP)

The Technology Opportunities Program (TOP) from the National Telecommunications and Information Administration gives grants for model projects demonstrating innovative uses of network technology.

U.S. Fire Administration Assistance to Firefighters Grant Program

The purpose of the program is to award one-year grants directly to fire departments of a State to enhance their abilities with respect to fire and fire-related hazards.

Other Grant and Funding Resources

Federal Emergency Management Agency (FEMA)

Federal disaster assistance and funding.

Justice Technology Information Network (JUSTNET)

The JUSTNET web site lists many grants and funding sources in the Virtual Library.

National Institute of Justice (NIJ) Funding Opportunities

NIJ is the research and development agency of the U.S. Department of Justice and is the only Federal agency solely dedicated to researching crime control and justice issues.

Office of Juvenile Justice and Delinquency Prevention (OJJDP)

OJJDP has recently announced funding opportunities.

United States Department of Justice (DOJ)

DOJ offers funding opportunities to conduct research, to support law enforcement activities in state and local jurisdictions, to provide training and technical assistance, and to implement programs that improve the criminal justice system.

Appendix 2 Request for Proposal IC 400141

Part II: Terms of Reference

1. Background

Industry Canada (IC) is responsible for managing the radio spectrum within Canada. IC is ensuring that the use of this resource will bring wealth and security to all Canadians.

Following the events of September 11th, 2001, IC with the help of the Radio Advisory Board of Canada (RABC), provided the opportunity for the public safety community to express their views on improving their ability to communicate more effectively by organizing a National Conference on Public Safety in Ottawa on March 27 and 28, 2002.

The National Conference on Public Safety identified a number of key issues in relation to Canada's Public Safety Radiocommunications System. Key among these was the perceived lack of a cohesive high-level organizational structure that represents Canada's major public safety organizations (police, fire departments, and emergency response) that can coordinate discussions on key issues as well as provide unified and consistent representations to Government on public safety organizations' needs in radiocommunications and important matters such as interoperability.

2. Project Requirements/Objectives

Based on analysis of input from important stakeholders (from existing material and face-to-face interviews), develop recommendations that would significantly improve coordination efforts among Canada's public safety organizations to identify and discuss the issues in radiocommunications and ways to address those issues; and, identify different options on next steps and possible means of funding.

Several options would be examined including empowering existing associations (e.g., Association of Public Safety Communications Officials (APCO), RABC, Canadian Wireless Telecommunications Association (CWTA), Canadian Association of Chiefs of Police et des Brigades d'Incendie); creating a new agency with broad mandate; establishing a short-term task force with specific mandate. Funding requirements and options would also be examined.

3. Scope of Work

Tasks to be undertaken include, but are not limited to:

3.1 Consultation with Important Public Safety Agencies in Canada

- Review the PriceWaterhouseCooper Consulting (PWCC) Report of the National Conference on Public Safety. The PWCC Report is a PowerPoint presentation of 28 slides, which is available on the Internet to conference attendees at the following address:
<http://www.rabc.ottawa.on.ca/english/symposium/>
(see section 7.2 of Part II)
- Review the four comments received by RABC from the Public safety Community on the Conference and on the Report. They are available at the same above address.
- Based on PWCC Report and other relevant information, prepare a list of key stakeholders with whom consultation will be undertaken to address organizational issues.
- In consultation with IC officials, prepare and execute face-to-face interviews with key stakeholders at different levels to confirm the issues identified at the Conference and to develop scenarios to deal with them
- Analyze the results of the consultations and develop practical options
- Oral reports at specific times are required and will be determined during the consultation with IC
- Submit an interim report to IC on the results of the consultation and suggested options. Number of copies of the report on required media, submitted at a specified date, will be determined during consultation with IC.

3.2 Development of Consensus View of Key Public Safety Agencies on Action to Take

- Organize a meeting of key stakeholders and convey findings and recommendations with a view to identify actions to undertake.
- Gather additional comments and input in order to develop a consensus view regarding the organizational structure
- Develop a consensus view on realistic action to take (next step)
- Submit a report to IC. Number of copies of the report on required media, submitted at a specific date, will be determined during consultation with IC.

4. Management of the Project

Industry Canada / Phuong Vu Manager, Mobile Service and Personal Communication, Spectrum Engineering.

5. Timing

The contract period will be for six months commencing at the time when this contract is awarded.

6. Security

A large part of the project is to get input from the key stakeholders which include Federal, Provincial and Municipal Police Organizations. These organizations are not willing to discuss their issues if the details will not stay within IC. In addition, IC has an understanding with those organizations that all information provided will be kept secret. The contractor's staff who are assigned to this project must have security clearance to the level of "Secret". A clearance obtained in the past is acceptable as long as it was not withdrawn due to a security reason. No contract will be awarded unless this requirement is met at the time of submission of proposal.

7. Mandatory Requirements

In order to receive consideration by Industry Canada, proposals **MUST** respond to the following mandatory requirements **IN THE ORDER SHOWN** and **MUST** include the referenced Section/Page in Bidder's proposal. Any proposal which fails to indicate clearly that all mandatory requirements have been met will receive no further consideration.

RFP Reference	Requirement (Bidder's proposal should repeat exactly as defined in the RFP)	Reference Section/Page in Bidder's Proposal
7.1	Evidence of knowledge and experience in Canada's public safety structure and/or Canada's public telecommunications systems by providing curricula vitae of all personnel proposed to participate in the project	
7.2	At least one of the personnel proposed for the project must have attended the last National Conference on Public Safety on March 27 and 28, 2002 as demonstrated by the bidder providing name(s) of all proposed personnel who were in attendance	
7.3	Acceptance of restrictions: release of personnel from contract work without a suitable back-up, continuity of assigned personnel and notice requirements for their replacement	
7.4	Acceptance of specific contract terms: scope of work as per section 3 in Part II.	
7.5	Certification – Bidders must complete, sign and return the certification forms as indicated in Part I of this RFP as per Sections 1.2(a) & (b), 13 and 16 (if applicable).	
7.6	Cost (Not to exceed \$84,000.00) GST and travel included. Provide full cost breakdown as per Section 10 below of Part II.	
7.7	The contractor's personnel who are assigned to this project must have a security clearance as per Section 6, Part II above at the time of submission of proposal.	
7.8	The proposal must be submitted in two separate documents: technical and financial proposal. No financial information may appear in the technical proposal.	

8. Rated Requirements

In order to qualify for the rating process, proposals MUST respond to the following rated requirement IN ORDER SHOWN and MUST include the referenced Section/Page in the Bidder's proposal. Any Proposal which fails to achieve the required minimum score for any rated item will be eliminated from further consideration regardless of the scores achieved for other rated items. In order to be further evaluated, the proposed bidders must achieve an overall minimum technical rating of 75%.

RFP Reference	Requirement (bidder's proposal should repeat Exactly as defined in RFP) Technical Rating	Points		Referenced section/Page in Bidder's Proposal
		Max	Min	
8.1	Bidder's understanding of the objectives of the project	10	7	
8.2	Bidder's understanding of the issues pertinent to the project	12	9	
8.3	Effectiveness of the bidder's methodology	13	10	
8.4	Extent of knowledge and applicability to requirements (Evidence of knowledge of current issues in Canada and in the field of public safety and/or public telecommunications systems in Canada by providing curriculum vitae of all personnel proposed for this project)	15	11	
8.5	Extent of experience, contact with participants and relevance to current requirements (Evidence of previous experience in the field of public safety and/or public telecommunications systems in Canada, as only those with experience with national public safety entities and with public telecommunications entities will be recognized by the communities of interest.)	20	15	

8.6	Corporate profile convincing record of fulfilling contracts on time and on budget; and, depth and balance of skills and experience of personnel proposed for project	10	7	
8.7	Approach to project management, including liaison and reporting to client and ability to deliver within the time frame period.	10	7	
8.8	FINANCIL RATING Total cost of the project including professional fees and office expenses, including travel, must not exceed \$84,000 (GST included)	10		

9. Oral Presentation

Project officers may deem it necessary to invite bidders to make oral presentations of their proposals in Ottawa and to answer questions necessary to clarify their proposal. Such presentation will be only by invitation of Industry Canada and at no cost to the Department.

10. Financial Proposal

The total cost of the project must not exceed \$84,000.00, including GST, travel and other expenses. Proposals costing more will be rejected, and will not be evaluated.

The financial proposal is to be submitted as a separate package to the technical proposal, and will be further assessed only if the technical portion of the bidder's proposal is considered to meet all the mandatory requirements, meets the minimum score for each rated criteria and receives a **MINIMUM OF 75 PERCENT** on the overall rated evaluation criteria.

No points are awarded for the mandatory requirements, but each must be met in order for the bidder's proposal to receive consideration and points for the rated evaluation criteria as described in the bidder's proposal.

Industry Canada maintains the right to charge penalties for late delivery of the project. Such penalties will be recovered from final payments owing upon conclusion of the project. Final payment will be contingent upon Industry Canada's satisfaction with the deliverables.

A full cost breakdown must accompany each proposal. Cost must be broken down as follows:

- Personnel costs
 - Number of days for each team member
 - Daily rates charged for each member
- All other expenses

11. Awarding of Contract

One contract only will be awarded, and it will be offered to the bidder whose proposal is deemed by the Industry Canada assessment team to give the best overall value. Should two firms be of equal final ranking (technical + financial), the firm with the highest technical points will be awarded the contract.

Appendix 3

Briefing Material re Consultations



January 22, 2003

Dear Colleague:

In March 2002, Industry Canada held a historic two day conference on Public Safety focusing on the issue of interoperability. The conference determined that Canada lacks a cohesive high-level organizational structure to represent Canada's major public safety organizations (police, ambulance, fire department and emergency response). Such an organization was deemed essential to coordinate discussion on key issues as well as provide unified and consistent representations to Government on public safety organizations' needs in radiocommunications and on important matters such as interoperability.

As a follow up to this conference, Industry Canada has contracted with RBP Associates and L'ABBE Consulting services to research the state of coordination and partnerships among Canada's public safety agencies.

The ability to communicate "on the scene" quickly and easily between agencies can be measured in lives. Today more than ever we must all be prepared to meet the interoperability challenge. The interoperability challenge is multi-faceted, with funding, spectrum, standards/technology and coordination and partnerships all key to successful resolution of this problem. The researchers involved in this project will undertake an extensive consultation approach with representatives of public safety organizations across Canada and to a limited extent in the United States of America.

From these consultations, a consensus view on how to significantly improve communications and liaison between these various groups will be developed. Stakeholders will be urged to buy into the concept that meets the needs and will be discussed with Industry Canada officials at a roundtable meeting tentatively scheduled for the week of the 21st of April 2003.

As a key stakeholder in the public safety community we invite you to join us to discuss this issue. In order to finalize our arrangements could you please advise us if you are prepared to meet with us. We will not be able to go to all communities in Canada but we will set up meetings in various regions and will advise on the date, time and location of the sessions.

For more information on the Canadian Public Safety Radiocommunications Project please visit our web site at www.pscom.ca. Responses to this letter can be e-mailed to johnlabbe@rogers.com or info@pscom.ca.

Sincerely;

John A.J. L'ABBE,
Assistant Commissioner RCMP (retired)

Roger Poirier
President, RBP Associates

Canadian Public Safety Radiocommunications Project



Background

- Canadians from coast to coast have come to expect that their public safety and security agencies are able to respond efficiently and effectively to a variety of events such as natural disasters, terrorist actions and criminal activities.
- When police, fire and emergency medical services respond to emergency situations, it is increasingly essential that they be able to communicate with one another.
- The ability to communicate "on-the-scene" quickly and easily between these agencies can be measured in lives.



2

Background

- Events such as September 11th have raised awareness of critical shortcomings in emergency response during times of crisis including the lack of interoperability between radio systems.
- In the US, expanding mission requirements due to homeland security necessitate greater capability, coverage, security, and interoperability for wireless systems
- Presidential and Homeland Security interests have raised the priority of these issues and is serving as a catalyst for action
- Cross border interoperability requirements are becoming a serious issue



3

Background

- In Canada, Industry Canada has recognized the importance of strengthening Canada's public safety system by helping to host the National Conference on Public Safety in Ottawa on March 27 and 28.
- The Conference identified a number of key issues in relation to the state of Canada's Public Safety organizations.
 - Current deficiencies in wireless communications put the general public, as well as public safety officials, at significant risk.
 - there is a lack of a cohesive high-level organizational structure that represents Canada's major public safety organizations (police, ambulance, fire department and emergency response).



Background

Among the common strategic issues affecting the public safety community:

- Spectrum Resources
- Standards & Technology
- Licence Fees
- Funding
- Interoperability



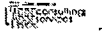
Background

Who speaks on behalf of
Canada's public safety community?



The Interoperability Challenge

"Interoperability" is the ability of public safety personnel from one agency to communicate by radio with personnel from other agencies, on demand and in real time.

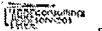


7

The Interoperability Challenge



The interoperability challenge is multi-faceted



8

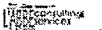
The Interoperability Challenge

Funding: A primary obstacle for developing interoperability

- Replacement costs likely several hundred million dollars
- Requirements poorly understood by senior managers.
- Funding mechanisms vary between jurisdictions

Standards & Technology

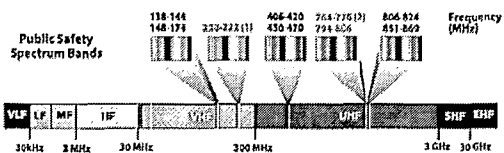
- Critical importance, but work is being done in Canada and US.



9

The Interoperability Challenge

Spectrum



(1) In the US, band is allocated for land mobile. In Canada, allocated to Radio Amateur use.
 (2) In the US, additional spectrum bands (761-776 MHz and 791-806 MHz) have been allocated for public safety use. In Canada, consultations have been done.



The Interoperability Challenge

Spectrum

- Public safety radio frequencies are distributed across three separate frequencies bands from VHF (136-174MHz) to 800 MHz (806-824/851-869 MHz), with no universally available and affordable radio being able to operate across the entire range.
- Spectrum planning essential for future interoperability requirements



Focus of this Research



Coordination & Partnerships

- Without **coordinated efforts**, jurisdictions around the country will continue to develop communications systems in isolation without regard to standardization, possible spectrum developments, and interoperability initiatives.
- This organization is needed to coordinate discussion on key issues as well as provide unified and consistent representations to Government on public safety organizations' needs in radiocommunications and on important matters such as interoperability.



13

Coordination & Partnerships

Industry Canada has retained RBP Associates and L'ABBE Consulting Services to:

- Develop recommendations that would significantly improve coordination efforts among Canada's public safety organizations
- Several options will be considered including empowering existing associations (e.g., APCO, RABC, CWTA); creating a new agency with broad mandate; establishing a short-term task force with specific mandate.



14

Consultations

- An extensive consultation approach with representatives of public safety organizations and other stakeholders across Canada (and the U.S.) to be undertaken.
- From these consultations, a consensus view on how to significantly improve communications and liaison between these various groups will be developed.
- Stakeholders will be urged to buy into the concept.
- Process ends with roundtable meeting in Spring 2003.



15

Appendix 4

Summaries of Consultations

Consultations were carried out in various parts of Canada with senior officials representing public safety agencies. In total, the researchers met with 134 individuals representing 94 separate agencies.

Because of the time constraints involved, most of the meetings involved a large number of individuals representing public safety agencies within a given geographical area. These meetings took the form of general discussions where individuals offered their views and provided suggestions on moving forward.

At each meeting, a presentation was made by the researchers using the package of information outlined in **Appendix 3**. Discussions then centered on a number of key points including specific problem areas related to radiocommunications (e.g., spectrum shortages, licence fees, congestion, state of equipment, etc.) In some cases formal presentations were given on the current state of radiocommunications systems in a particular province or municipality.

The following provides a summary of these meetings.

General

There were a number of issues raised that were common to all meetings. The issue of spectrum was discussed at all meetings held with public safety representatives. In general, access to spectrum was deemed a major and growing problem. In general, the public safety community is pleased with the role of Industry Canada although there was a recurring theme that public safety should be given a higher priority than other radio users when it comes to accessing spectrum resources.

The issue of interoperability was raised by the researchers with a presentation on the key challenges. Officials expressed skepticism that large scale interoperability can be achieved citing problems of cooperation between different sectors or jurisdictions, union issues and in particular funding problems. Nevertheless, there was also agreement that unless an attempt is made at tackling the major barriers, nothing would ever be achieved.

On the question of "Who speaks for Public Safety in Canada?", there were a number of discussions on the role of existing entities such as APCO, CACP and CAFCC. With very few exceptions, there is a clear sense that no single entity speaks for public safety. Existing organizations are either ill-equipped or ill-suited to represent the public safety community in the area of radiocommunications.

In developing better communications and coordination, participants were presented three options including empowering existing organizations to undertake a broader role, creating task force or establishing a new organization. The overwhelming consensus is for the creation of a new high-level organization. A notable exception relates to APCO where several individuals suggested that APCO would be the right organization to undertake a broader lobbying role.

The role of various levels of governments was also discussed at each meeting. In this regard, participants would like to see greater partnership with Government entities in order to tackle the issues. Another recurring theme related to the need for new Government funding initiatives for radiocommunications systems.

Appendix 5 Written Submissions

Written submissions were received by the following individuals and organizations:

Ted Campbell (personal contribution)
Robert Simmonds, Executive Vice President Regulatory, Telus Mobility
William. Holdridge, Unit Commander Communications Services Toronto Police
David E Campbell, A/Manager P.E.I. Emergency Measures Organization
Doug Hammer, 1st Vice President New Brunswick Association of Fire Chiefs
Lee Grant, Fire Chief Peterborough Fire Dept.
Douglas MacDonald, Ambulance Operators Association of PEI
Ron Dingwell, Atlantic Region - RCMP

Practical Interoperability

**E.R. (Ted) Campbell
Ottawa**

10 February 2003

**Advice from : Andy McGregor
Rob Morse
Jian Wu**

Table of Contents

Abstract	3
INTRODUCTION	4
The NATO System.....	5
The CCEB Alternative to NATO	6
AIM.....	8
PUBLIC SAFETY INTEROPERABILITY	9
The Challenge	9
Achieving Interoperability.....	11
The Process	12
Step 1 – Establishing Requirements	12
Step 2 – Scoping the Standardization Problem.....	13
Step 3 – Setting Standards	13
Step 4 – Approving Standards	15
Step 5 – Ratification.....	15
Step 6 – Implementation.....	16
ORGANIZATIONAL APPROACH.....	17
ORGANIZATIONAL APPROACH.....	17
General.....	17
Principles.....	17
Proposal.....	17
CONCLUSION.....	20

Abstract

Interoperability is an elusive goal but it has been approached and accomplished by the military – most recently and effectively by Western alliances like NATO.

This paper adapts the *model* used by military interoperability planners to propose a process for use by Public Safety agencies – local, provincial/state and federal – in both Canada and the United States.

The paper is focused on *tactical* radio based systems but it recognizes that some standards – notably for data definitions – must be shared by a wide range of systems – large scale, leased, fixed computer systems and highly mobile, hand held radios alike.

The paper notes that the rapid rate at which hardware ‘generations’ develop means that the process must be quick – this argues against a large, highly structured, bureaucratic process and for a level of informality.

It proposes a small, focused Canadian standardization coordination agency which will *lead* the process of achieving interoperability through standardization by:

- Developing operational requirements for interoperability;
- Working with technical experts to identify areas requiring standardization;
- Delegating the standards writing process;
- Approving standards;
- Managing the ratification process; and
- Helping public safety agencies and vendors to implement interoperability standards.

Practical Interoperability

E .R . (Ted) Campbell
Ottawa

10 February 2003

INTRODUCTION

Interoperability – meaning the capability of two or more disparate organizations to work together to accomplish some task - is an ancient concept: Roman military commanders wrote about the requirement for units from far- flung corners of the empire to be *interoperable*. One favourite method of achieving interoperability in the Roman army was through standardization. Roman units – whether from Rome itself or distant Gaul or Parthia were all organized, equipped and trained to common standards. A Roman commander and his subordinates knew – with reasonable certainty – what a new, strange unit could do and would do under certain circumstances and, indeed, the Roman tactical leaders – the *centurions* – knew how to give orders to units even when the centurion and the soldiers did not share a common language. Interoperability was a *force multiplier* for those long dead Roman commanders – an *ad hoc* mix of interoperable units could perform almost as well as a single formed,

cohesive unit. Several dispersed small units could be assembled, quickly, and could operate (relatively) effectively – thus, obviating the (expensive) requirement to maintain several large units. Interoperability came to the fore again in the early days of World War II. US President Franklin D. Roosevelt ordered his navy to sea, to protect *neutral* US merchant ships well before America formally entered the war. This caused an immediate problem. Although officially neutral, the US Navy ships were ordered to *cooperate* with the ships of the British and Canadian navies; this was difficult because the various communications used at sea – visual (flags and lamps) and radio – were not *interoperable*. The British used different flag hoists and even a different version of Morse code for lamp signalling. A very small *combined*²² ‘board’ was established to develop interoperable communications. It did its work in

²² The terms *combined* and *joint* have specific meanings in allied military circles. Combined means two or more nations and Joint means two or more services. Thus, a force composed of Canadian and US warships would be a *Combined Task Force* while a force consisting of Canadian army and Canadian air force units would be a *Joint Task Force*. A force consisting of Canadian and British Army units and US air force units would be a *Combined Joint Task Force*. This matters only because the words will be used in a similar manner in this paper: Combined will be used to mean different levels: Canada/US – federal/local, for example while Joint will be used to refer to different types: police/fire, for example.

quick time and became the first of many 'Boards' reporting to the *Combined Chiefs of Staff Committee* which 'managed' World War II. The first output document of the modern standardization process was an *Allied Communication Publication* (ACP). These documents are still issued, revised and regenerated to-day – still doing the same job: ensuring *practical* interoperability.

The NATO System

Interoperability grew more and more important and *combined* and *joint* procedures and technical standards were developed for a whole host of functions ranging from aviation fuel designations through to secret codes. When, shortly after World War II, the North Atlantic Treaty Organization was formed *interoperability* and *standardization* once again became major issues. NATO commanders, like their Roman predecessors, two millennia in the past, had to be able to deploy and employ disparate forces from far-flung corners of the alliance – British, Canadian, Norwegian and Italian army and air force units were combined into a single task force. NATO established a *Military Agency for Standardization* (the MAS) to help manage the necessary process. Almost the first lesson that the MAS learned was that *standardized* meant *interoperable* **not** common. NATO members nations, large and small, were unwilling to agree to procure the same item from a sole source – even when that would mean much lower capital and life-cycle maintenance

costs. Individual national industrial strategies and policies meant that most nations reserved the absolute right to overspend in order to buy from local factories – to spend local dollars on local wages, etc. Nations were, however, willing to design, build and procure to common NATO standards **IF** those standards could be developed sufficiently far in advance – so that national industries could compete on a reasonably level playing field.

NATO developed a standardization *regime* in which the allied (combined) military staffs identified areas requiring standardization in order to achieve interoperability and then technical committees consisting of national experts were formed to develop the standards. The standards, in the form of *NATO Standardization Agreements* (STANAGs) were, after technical consensus was achieved, circulated to nations for **ratification**. Ratifying a NATO standard is a high level bureaucratic function which *requires* the nation to use the ratified STANAG in **all** applicable procurement contracts. The STANAG development and ratification process had enormous financial implications and the process, of political necessity, became more and more complex, bureaucratic and expensive.

The process achieved its aim: NATO member nations could procure systems – weapons, radios, trucks, etc – which met their specific operational, financial and political requirements and, simultaneously,

provided an agreed (by allied senior commanders) minimum level of interoperability. There was a price, however, NATO's *Military Agency for Standardization* became a tool in Trans-Atlantic and Intra-European trade disputes. In an effort to keep the process fairly *pure* – from a military perspective – NATO added layers of bureaucracy to review the work. The process ground things fine, but oh so slowly!

While the NATO process was growing in complexity and, concomitantly, slowing down, one area of interoperability was going through a rapid decrease in *generation* length: command, control, communications, computers and intelligence – known by the not very imaginative acronym of C⁴I. As C⁴I systems became more and more capable they also became cheaper and the rate at which major, generational, changes were made became shorter and shorter. The NATO standardization *regime* had greater and greater difficulty in keeping up.

The CCEB Alternative to NATO

When World War II ended almost all of the multitudinous *Combined Boards* were disbanded – all but one: the Combined Communications Electronic Board (CCEB). The CCEB remained in place and grew from an Anglo-American to a five nation organization, with members being: Australia, Canada, New Zealand, the United Kingdom and the United

States. The Board, proper, is small, consisting of

- *Principals* – the five most senior officers responsible for Joint C⁴I matters in each nation;
- A small – half dozen individuals – permanent staff; and
- A few committees of subject matter experts – the longest serving being the *Frequency Planners*.

The CCEB *advises* **but does not direct** the work of several allied agencies – most consisting of the CCEB's five member nations but, since the '80s, the CCEB has even *advised* NATO (15+ members, not including Australia and New Zealand) on matters related to C⁴I interoperability and standardization – especially on matters related to frequency management, communications security and cryptography and message handling procedures. It has done so, in large measure, because it is small, flexible and informal – these attributes mean that it can *advise* various multinational standardization agencies in a *timely* manner: one consistent with the pace of change in the C⁴I domain. The CCEB still oversees the publication of *Allied Communications Publications* which are also used by NATO.

Other Models

The interoperability business is not exclusive to the military, by any means. There are many groups – such as the *combined* ETSI (European Telecommunications Standards Institute) and TIA (Telecommunications Industry Association) Project MESA team – working on standards in the public safety and broader, general commercial domains. There is no reason why the civil domain – private and public sectors alike – cannot establish and implement interoperability agencies or bureaus.

AIM

While allied military forces have established detailed methods and procedures for accomplishing their interoperability goals these are not universal models. The **aim** of this paper is to use the military's methods to make some **practical** recommendations for an *organizational approach* suitable for use in Canada to accomplish the required levels of interoperability amongst public safety agencies.

PUBLIC SAFETY INTEROPERABILITY

The Challenge

The interoperability *challenge* for public safety agencies is not unlike that which faced NATO in the '50s. In the '50s there was, in the alliance, (generally) well understood but largely undocumented *requirement* for interoperability, and there were only a handful of competing systems available for any given function – mainly British and American World War II leftovers, plus a few British and French and rather more American new products.

One of the early challenges for NATO's military C⁴I interoperability planners was to develop a simple model for interoperability in order to determine what needed to be standardized. Some elements were intuitively obvious and required little if any study – standard frequency bands, for example, are a *sine qua non* for interoperable radio systems. Other elements, like information security and cryptography and data structures required – and *still* require – more and more detailed consideration.

The *simple* model did not last for long – as technology made more and more functions achievable the C⁴I systems became more and more complex and the model grew from

one simple model to several increasingly complex ones. It became evident, early on, to the NATO C⁴I and CCEB planners that systems had to be divided into categories – the principle categories were:

Strategic – which usually meant fixed (usually wire-line) and transportable systems linking major headquarters, the various national capitals and even the national defence industrial base elements in some nations; and

Tactical – which usually meant a mix of single service and joint systems in both national forces and in combined (allied) forces. Radio based systems predominate in the *tactical* field.

It is suggested that Public Safety agencies in Canada and the USA are in an analogous situation:

- **Public Safety C⁴I systems have grown, rapidly, from fairly simple, 'chain of command' systems – in the '80s and early '90s – into large, integrated, custommade, homogeneous networks employing a variety of techniques and technologies.**
- **The absolute number of products available in each functional market is not large but they can be mixed and matched in a**

huge variety of ways – each mix being noninteroperable with several other mixes.

- There are, also, both strategic and tactical public safety networks – systems like the network serving the RCMP's Criminal Intelligence Program constitute part of a *strategic* system. Most public safety C⁴I systems are, however, tactical and that means – as it does for the military – that they are radio based systems. That being the case it is also intuitively obvious that standard frequency bands and similar standards are *essential* for any reasonable level of interoperability at the tactical level.
- Finally, local budgetary considerations are all important. There are, literally, hundreds – probably thousands – of individual public safety agencies, large and small, including the Royal Canadian Mounted Police and Toronto Fire Services, at the large end and the New Waterford Volunteer Fire Department and the Happy Valley-Goose Bay Community Constable at

the other. Each agency has its own budget – set by elected councils and legislatures and parliaments – and each budget defines what can be spent on C⁴I and when that spending can occur.

It is a serendipitous that much of the interoperability which exists, now, is accomplished without any technical planning – it is imposed by (mostly municipal) *budgeteers* who are intent on standardizing in order to reduce both capital and life-cycle costs.

This means that budget directors – especially from municipalities - are key players in the public safety interoperability game.

Achieving Interoperability

The first and most important aspect in achieving interoperability is to define what is required. This is, also, the most difficult because the easy answers – ‘everything’ or ‘just these little bits here and there’ are almost invariably the wrong answers. C⁴I interoperability requires that standards are developed, accepted and *ratified* for all system components which are *essential* for a desired level of interoperability. Some standards are technical and reasonably obvious: modulation technique, for example. Others are procedural – a perfectly standardized telecommunication system is worthless if the users do not understand what the request or orders mean. Still others are a mix – data dictionaries, for example. Consider a radio system; the following must be ‘standard’ in order to achieve any level of interoperability:

- Frequency
- Channel bandwidth; and
- Modulation technique.

Provided the users all speak the same language some level of intercommunications – the exchange of information, requests or orders – is possible. That intercommunication may be imperfect, even deeply flawed, unless the words used have some common, standard meanings – this is the part of the business of

standardized procedures which lead to Standard Operating Procedures (SOPs) and glossaries.

When the transition is made to digital systems then the standardization ‘bill’ gets higher. Not only must frequency and modulation technique be standardized but so must things like data dictionaries so that the manifold advantages of digital communication are not lost to the users.

A final level of difficulty is seen when information security is factored into the equation.

There is a clear requirement for a PROCESS – a *managed process* – which can enable diverse Public Safety agencies (police, fire, ambulance, etc) at different levels (federal, provincial/state and local) on both sides of the border to adopt common standards which will ensure interoperability without robbing those agencies of procurement choices.

The Process

There are six steps in the established, proven processes of accomplishing system interoperability:

1. Identification of the **operational requirements**;
2. Identification of the **elements requiring standardization** in order to achieve the required levels of interoperability;
3. **Development** of the necessary standards;
4. **Approval** of the standards;
5. **Ratification** of the standards; and
6. **Implementation** of the standards.

Step 1 – Establishing Requirements

Step 1 is the responsibility of senior operational personnel. There must be, at the beginning of the process, a clear, well defined, supported AIM. The AIM – to achieve the operationally essential (required) level(s) of interoperability – must be valid and achievable. The validity is the sole responsibility of those with responsibility for and authority over the public safety agency – usually senior, professional officers and elected officials. There will be limitations on the operational

requirements: practical, technical limitations which may be identified by vendors' representatives, and financial limitations which will, likely, be imposed by the same elected officials on the advice of their budget staffs.

There is a difference in levels of interest in and commitment to interoperability between different types of agencies (police, fire, etc) and, especially between different levels. Fire departments, for example are very interested in being able to interoperate with other local public safety and safety *related* agencies (rail, gas and hydro, for example) but the Vancouver fire department is not interested in interoperability with the Montréal fire service. The Vancouver police, on the other hand, need to exchange information – including very, very sensitive (secret/police intelligence) information with other Canadian and US city, provincial/state and federal law enforcement agencies.

Just because an AIM is valid (and even if it is both valid and achievable) is no guarantee that everyone will agree that it should be accomplished. Interoperability must be **sold** and **sold** again and again, as a vital AIM – interoperability must, constantly, fight its way on to the policy and **spending** agendas of the senior public safety officers and politicians. Senior officers rarely have time to spend examining issues like interoperability – they need to use *trusted* specialist staffs – maybe

uniformed people, maybe outside consultants.

There is, clearly, a need for some body – an independent, operationally competent, and technically respected body – to develop the requirements for many agencies.

This same body will be required to re-enter the process for steps 5 and 6 – ratification and implementation.

Step 2 – Scoping the Standardization Problem

Step 2 is a technical matter which must be done on behalf of the senior commanders and the budget people. It involves identifying what must be included in the standardization process in order to accomplish the AIM. There may be realistic trade-offs in this step, i.e. it may be possible to standardize a complete system or to develop standards for separate system elements which may result in lower costs and greater flexibility – at the price of doing more hard but low cost ‘paper work’ at the very beginning of the process.

There is, also, a need for that same body to define the scope of the interoperability and standardization process.

Step 3 – Setting Standards

Step 3 is the work of technical experts representing *competing* interests. The overarching goal of achieving interoperability through standards is to allow different

organizations to procure systems which meet their specific operational and financial requirements and, simultaneously, ensure that the minimum required levels of interoperability are provided. This means that the standards development process must aim to ensure that standards are *open* so that no vendor is precluded from using them to develop systems.

The standards must cater for the fact that there are, generally, at least four, and usually five generations of systems in use or under development:

1. **Obsolete** technology, demonstrably inadequate, remains in service in a very few agencies. It will be placed, probably in the near future.
2. **Obsolescent**, but still adequate, technology is in service in many agencies – it will be replaced (most likely by 4 (newest technology) or even newer technology) in near time – a very few years;
3. **Modern technology** is in use in many agencies – it will not be replaced for several years;
4. The **newest technology** which is entering service with a few agencies – it will remain in service for a decade; and
5. Technology which is still **under development**.

The *fifth generation*: consisting of systems which are, currently, under development, is the hardware generation which is most likely to be subjected to standardization. It is always difficult and sometimes impossible to impose interoperability standards on systems which are in service – the level of difficulty increases, directly, with the amounts of money which must be spent.

Systems should, generally, be backwards compatible for at least one generation but system designers may have to avoid this when a major technological change – analogue to digital for example – takes place.

When, for example, an obsolete generation includes a unique feature, then the standards need not require interoperability of that feature. The newest in service systems must interoperate with the modern systems and it would be nice, but not essential, if they could interoperate – at some levels – with the *obsolescent* systems, too. The systems under development will be required, by *ratified* standard, to be backwards compatible with both the newest inservice and modern systems.

The complete set of standards will, certainly, cover both technical and procedural areas.

There is a special requirement to consider data dictionaries and information technology standards because they will – especially the data dictionaries – apply to strategic

(largely fixed/wire-line, often leased systems) and tactical (radio based/mobile and often agency owned) systems. Data must be entered into systems at some point but once entered it should be transferred easily from user to user – even when it must be encoded, decoded and re-encoded to go from one system to another – without being manually re-entered. Manual data re-entry takes time – which may risk lives – and usually guarantees errors.

It is helpful if there is a large scale/high level system plan within which each system standard can be developed. This is not always possible and a *combined* Canada/US – federal/provincial/state and local - and *joint* - police, fire, ambulance, rail, gas, hydro, customs, coast guard etc, etc - system model might be too complex to be of any use.

Those planning interoperability for tactical systems should, however, have a functional model in mind. This model consists of:

- Two or more autonomous control/ despatch centre;
- Several mobile units directly subordinate to each control/despatch centre;
- Several *related* fixed and mobile units – including e.g. press liaison/ public affairs.

Each *connection* between any of

these users should be considered as, at least, a *potential* interoperability requirement. Some may end up being formally excluded from consideration or – in the case of the press, for example – might create a requirement for **exclusivity** in one or more public safety systems. Overlaying the model are:

- Procedures;
- Data definitions and structures; and
- Information security.

There should be a formal structure for the standards development process.

In-so-far as the standards development process is aimed, primarily, at tactical/radio systems the *Radio Advisory Board of Canada* might be the best forum for developing technical standards.

Step 4 – Approving Standards

There must be a formal mechanism to vet and approve (or return) standards.

The standards process will only work to the benefit of all – users and vendors alike – if it is trusted. It will only be trusted if the standards proposed make good sense. In large military alliances like NATO the established chain of command ensures the all standards are reviewed – more than once – by increasingly

senior people, with the focus shifting, gradually, from purely technical to essentially political and economic issues. This is not practical when considering *combined* and *joint* public safety agencies.

There is, probably, a requirement for some form of independent national review body – one with technically and operationally qualified people – to provide some level of approval to work done by standards writing bodies. This work can be done by the same body which led the standardization process.

Step 5 – Ratification

Ratification is the key step in taking the standardization process from theory to practice. Ratification is required to ensure that standards will be adopted. Given that senior levels of government find it impossible to impose standards on junior levels unless those standards are accompanied by large sums of money, it is essential that all levels of governments embrace standards out of a sense of self-interest – usually financial self-interest. That self interest may be evident to one and all on any given day in any given year but when it comes time to open bids and let contracts then political and financial interests may predominate. NATO's experience with this phenomenon led to a programme which encourages nations to ratify standards and then uses large scale

ratification to encourage vendors to build to those standards.

In the military environment standards are developed by technical experts and approved – within an alliance – by a series of ever more senior bodies which bring technical, operational and policy knowledge to bear. Finally, senior *national* bureaucrats – Assistant Deputy Ministers in Canada, are invited to ratify the standards and, by so doing, to officially undertake to incorporate those standards in the appropriate procurement efforts. Once a NATO STANAG (say, STANAG 1234 dealing with screwdriver tips, for example) is ratified then it **must** be included in all screwdriver procurement contracts.

The process of *inviting* nations to ratify is, in fact, a *selling job* – nations must be persuaded that the benefits of ratifying this that or the other standard outweigh the very real costs.

A similar process can work for public safety – individual jurisdictions (cities, provinces and federal agencies) can be invited to ratify standards – promising to procure to those standards when the time is right. A suitably large pool of ratifications will help vendors decide to produce standardized systems for sale. The business of *selling* ratification is not too much different from the business of *selling* the initial interoperability programme.

There is a clear requirement for body to *sell* standards to civic, provincial and federal agencies – *agencies with authority* – and to secure ratification.

Step 6 – Implementation

The final step is required because there are so many pressures on individual agencies – public or private, civilian, military and public safety alike – that ‘backsliding’ is a constant threat to the interoperability programme.

Ratified standards must remain ‘on the books’ until they are both obsolete and no longer needed to ensure intergenerational interoperability.

ORGANIZATIONAL APPROACH

General

Given the broad range of public safety agencies and the diversity of requirements of and resources available to each – and the binational nature of the challenge – it is posited that a separate agency is required to coordinate Canadian interoperability and to liaise with US agencies engaged in similar tasks.

Principles

The following principles are considered to be vital to establishing an efficient (cost effective) and effective organization:

- **Informality** – it is considered to be impossible to create any agency in Canada which could direct federal, provincial and local public safety agencies to standardize anything. The only practical approach is to create an organization or agency which can advocate, cajole, prod and **lead** the standardization process.
- **Economy** – the organization which will be able to **lead** a standardization process in a fast changing field like radiocommunications will have to be *nimble* – which means it will have to be small.

Small organizations achieve two kinds of economy –

1) *Financial* – small organizations are (or should be) more economical to operate than large ones), and

2) *Economy of Effort* – small organizations must find ways to focus on key issues, only, and delegate or contract out everything else.

- **Focus** – the small, informal agency which will *advocate* and *lead* the standardization process must be focused on advocacy and leadership, not on detailed technical issues. The agency must have **both** public safety *operational* and (radio) *technical* credibility so that it can act **for** the many and varied public safety agencies.

Proposal

The Government of Canada should *lead* a process to promote and develop interoperability standards for public safety.

This should be done by establishing an independent body charged with:

1. Identifying interoperability requirements;
2. Identifying standards required to accomplish the necessary levels of interoperability;

3. Assigning standards writing tasks to appropriate standards writing organizations – including the *Radio Advisory Board of Canada* for radio technical standards;
4. Approving standards;
5. Securing ratification of standards; and
6. Monitoring contract actions to ensure that ratified standards are, indeed, called up.

It is considered that one, *independent*, publicly funded, fairly small, agency can manage all six functions. The staff needs four areas of expertise (in addition to leadership and administration):

1. Public safety operations;
2. Communications;
3. Standardization;
4. Lobbying.

It is likely that the entire agency can consist of something like seven to 10 people working, mostly part time – some as consultants, with an annual budget of less than \$750,000, for all functions.

This agency or board or bureau or commission or group or whatever should be funded by public agencies from **all** of the federal, provincial and local levels. Money need not come

from every – or even most – public safety agencies but all three voices need to be heard inside the bureau. Private sector money should not be used so that the bureau can never be accused of being advocates of a *solution looking for a problem*.

This bureau should deal with the many and varied groups – associations and agencies themselves – on both sides of the border, with stakes in interoperability and it should develop a **Joint Statement of Requirement** for interoperability. It should then pass parts of that **SoR** to the **Radio Advisory Board of Canada** to be used to develop standards for the management and use of the radio frequency spectrum by public safety agencies – at the local, regional/provincial, national and international levels.

This is an area in which *independence* is of paramount importance. The public safety community is not well defined – many law enforcement agencies believe that it should be very *exclusive* while other agencies feel that actors like gas companies, railways and hydro companies must be included in radiocommunication system planning. The agency must be free to consult with whichever groups of experts it deems appropriate for any given issue.

Despite the large, diverse community of interest, it is suggested that the large, complex NATO model is not suitable for this endeavour. The

established NATO military system is too large and too expensive and, consequently, too slow. It is, also, perhaps unfairly, perceived by many of the small NATO nations to be dominated by and weighted in favour of a small number of large nations protecting defence industry corporations. The other military model - the Combined Communications Electronic Board - is more suitable. It leads rather than directs. It leads by using a small staff to develop sound, sensible solutions to real problems. These solutions make their way (thanks to three CCEB members) into NATO where, fairly quickly, they become NATO standards. The CCEB invites NATO or one of the smaller allied (ABCA Armies (Australia, Britain, Canada and America) or AUSCANZUKUS (navies)) groups to develop necessary technical standards to support its interoperability *solutions*, which are SoRs.

CONCLUSION

Interoperability is a cheap *multiplier* of the operational effectiveness of military forces and public safety agencies.

The *ideal* way to accomplish interoperability is by imposing common procedures and common equipment. It is not, however, a practical way for Canada because no single government or leader has either the authority or the power to impose such measures.

The *best* way to achieve interoperability is by developing standards which will ensure that there is a marketplace offering a wide range of interoperable systems to the even wider range of customers.

There are six steps in the process of accomplishing interoperability:

1. Identification of the **operational requirements**;
2. Identification of the **elements requiring standardization** in order to achieve the required levels of interoperability;
3. **Development** of the necessary standards;
4. **Approval** of the standards;
5. **Ratification** of the standards; and
6. **Implementation** of the standards.

These steps can best be accomplished if they are led by a small, independent, publicly funded – at arms length from vendors – agency or bureau which will **do** steps 1 and 2, delegate step 3 to a competent standards writing body like the **Radio Advisory Board of Canada**, **do** step 4 and then **manage** steps 5 and 6.

OPINION

According to...
Bob Simmonds

The Role of Commercial Carriers in Providing Public Safety solutions

Twenty years from now, and probably much sooner than that, it will be the exception rather than the rule for a public safety agency to own and operate its own dedicated radio communications system.

This will be quite a significant reversal from the situation that exists today. Public safety radiocommunications in Canada have traditionally been provided using so-called "private" systems – a system that is licensed, owned and operated by the public safety agency itself. These systems are custom designed for each particular public safety agency's unique needs: specific coverage areas, traffic profiles, functional and operational requirements, and the particular frequency band and specific channels for which it has been able to justify and acquire radio licences.

I submit that important potential advantages exist inherently in the use of large-scale commercial wireless systems for public safety communications. The significant benefits that will be unleashed as a result will inevitably and relentlessly drive forward the widespread use of commercial systems in the public safety arena.

I recognize this view may be somewhat controversial in certain quarters. Admittedly, commercial systems have only been used for primary public safety communications in relatively few instances in the past. For example, TELUS Mobility has successfully served the Durham Regional Police Service using an iDEN public safety solution since 1998. However, only a handful of large-scale cellular technologies, like Motorola's iDEN system, can even be considered today for use in a public safety environment. I am the first to acknowledge that commercial systems are not yet ideal for every public safety situation.

Nevertheless, a number of additional enhancements are on the drawing board for commercial wireless technologies that will overcome many of the traditional inhibitions and objections to their widespread use for public safety over time.

It is also clear that public safety agencies face a number of difficult issues and challenges arising from the use of dedicated private systems, not only in Canada but around the world. Even prior to the horrific events of September 11, 2001, significant efforts were underway toward improving the current state of public safety radiocommunications systems in such fora as ITU-R WP8A, looking at the question of Public Protection and Disaster Relief (PPDR). Of course, the tragedy has lent new urgency to these issues, and has led to recent initiatives by the new Homeland Security Agency in the United States and a recent Radio Advisory Board of Canada (RABC) conference on public safety which was attended by a number of CWTA members in Ottawa in March.

The public safety environment in Canada was summarized succinctly in a recent newsletter circulated by Lapp-Hancock:

“Unfortunately, public safety radiocommunications in Canada is currently unstructured, has widely varying standards, and operates systems with greatly varying capabilities, age and effectiveness. The majority of our public safety radiocommunications systems are controlled at the municipal level and they serve individual public safety organizations, are shared between two agencies such as police and fire, or are being shared among all public safety and public service organizations within the municipality. They can vary from the very small with a single tower site and limited coverage, to the very major systems serving Greater Toronto and Greater Vancouver.

Operating separately from these municipal organizations are provincial and regional mobile communications systems. Once more, these vary greatly in age and capability and may be provided by the provincial government or, under a leasing arrangement, by the local common carrier. It is true to say that currently, there is no national federal public safety radiocommunications system, although the Royal Canadian Mounted Police (RCMP) have radiocommunications systems in each province and territory that can and do operate together.”

There is definitely a role for commercial wireless networks to play as we work to solve the problem of replacing Canada's aging public safety networks. Let's look at some of the key advantages offered by a commercial network public safety solution:

Cost

Initial Cost: Piggybacking on the enormous wireless infrastructure capital investments made by commercial wireless providers effectively eliminates the initial cost and, perhaps even more importantly, the substantial financing requirements necessary to build out a system by a public safety organization. Quite often, a commercial system already operates in the desired coverage area, providing benefits such as being able to “try before you buy” and significantly reducing deployment risks and time to deploy.

Operating Expense: The fact that commercial networks are driven by millions, and not merely thousands, of users allows the use of relatively low-cost user devices (handsets, data modems, etc.). The substantial annual network maintenance costs typical of dedicated private systems are eliminated, as is the need for the public safety agency to acquire radio spectrum. Of course these reductions are offset by an additional airtime cost component for the use of the commercial network, but this also includes access to substantially increased amounts of network capacity, signal penetration and radio spectrum that could never be justified by the public safety agency alone.

Upgrade Costs & Evergreening: Public safety agencies often face significant costs and complexities whenever they wish to upgrade their private systems. Commercial wireless systems and product offerings are constantly upgraded by the service provider in terms of functionality, coverage and capacity in order to meet market demands, with no additional costs to users. The onus is never on the client to initiate upgrades. Most are done with over-the-air software improvements that are often transparent to the client.

Coverage

Public networks offer coverage advantages simply impossible for private networks to match. Billions of dollars have been invested and continue to be spent on such systems, providing superior signal penetration and overlapping coverage redundancy from multiple cell sites in many cases. Redundant spending by each separate public safety agency or group of agencies to replicate coverage (usually to an inferior level) over the same territory makes little sense, and certainly has to be questioned from the taxpayers' perspective.

Capacity

The capacity of the private systems used by public safety today is relatively tiny compared to that available from a commercial network for two reasons. Firstly, only a relatively small amount of spectrum can be justified by a particular agency for its own needs. Secondly, because capital costs are dictated heavily by capacity, the infrastructure is sized with very little headroom, usually only enough to handle the short and mid-term requirements for that particular agency. Commercial network capacities, on the other hand, are orders of magnitude larger. For example, the total traffic consumption of the Durham Regional Police Service is 100 times less than the total traffic capacity of the iDEN system deployed today in the Durham region. Of course, network capacity can be easily expanded further without any cost impact to the Durham Regional Police. Here's another way of looking at this: When combined with priority access capability, the Durham Regional Police have 100 times the additional available capacity at their fingertips should they require it.

Guaranteed Access

Of course, public safety users considering using commercial networks must be confident they can continue to have access, particularly in disaster scenarios, when the multitude of commercial users of the network drive traffic levels on the network far beyond normal capacity levels. Priority access is a feature available in certain commercial wireless systems today and is critically important in alleviating this concern.

Interoperability

The lack of interoperability is a chronic and well-known issue often discussed at length within the public safety community. This is the age-old problem in which, for instance, police cannot communicate with fire or ambulance personnel at the scene of an incident. This is largely due to the use of independent private systems acquired and operated by each public safety agency, often in different spectrum bands, and often with incompatible technologies and different coverage and budget requirements. While use of commercial networks may not solve every issue, they can improve this situation in many respects. Coverage offered by the commercial service provider usually transcends the specific jurisdictional border of any particular public safety agency, facilitating coordination and

cooperation between adjacent, overlapping or even whole clusters of agencies with no additional cost penalties.

Data & Other Features/Functionality

The potential of millions of commercial network users has also driven an enormous amount of R&D spending to enhance data capability and other features and functionalities on a scale simply unapproachable in the private system arena. Data rates of the various commercial wireless technologies are rapidly being improved, while private systems are inherently limited in this regard for the same reasons they're limited in capacity.

Increasing Technical Complexity

Smaller public safety agencies, and even many larger ones, are finding it more and more difficult to deal with the increasing complexity of wireless systems. Acquiring, implementing and maintaining the multitude of middleware components required to operate increasingly sophisticated high-speed packet data capabilities is but one challenging example. In the case of commercial wireless networks, experts from the system provider are available to assist clients. Furthermore, commercial wireless network operators have highly trained technical experts monitoring the network on a 24/7 basis from multi-million-dollar monitoring centres. Well-equipped and trained technicians are available on a moment's notice to maintain the system or drive to a particular cell site.

Control

One common argument against the use of commercial networks for public safety is a perceived reduction or loss of control by the agency over its critical communications. While this may be true to a limited degree, in other respects the level of control and security can actually be significantly enhanced. There are many examples, but take only the simple example of a public safety agency requiring additional capacity not previously foreseen. With a commercial network approach, the agency can instantly make use of the increased capacity.

In a private system scenario, on the other hand, the public safety agency might well have to work with the manufacturer to scope out, determine the feasibility and cost of a capacity upgrade. Then it would have to develop and present a rationale to justify the potentially significant additional capital outlay to a city or town council to get the necessary funds, with no guarantee of success. Additional spectrum might also be required, demanding significant time and effort to acquire even if it's available. Finally, the agency would have to place its order with the manufacturer and brave the implementation process itself. In which of the two scenarios does the public safety agency truly have more control?

Enormous benefits stand to be gained both today and in the future through the use of commercial systems for public safety services. I would encourage Canada's public safety organizations to take a hard look at these benefits before they commit to purchasing private systems.

Bob Simmonds is Executive Vice President, Regulatory at TELUS Mobility.

**Comments from
Toronto Police Communications Services**

The Toronto Police Service has been working collaboratively with the Toronto Fire Service and the Toronto EMS to achieve interoperability in voice and data communications. Of late, we have achieved interoperable voice communications, with all emergency services operating on a single 800 MHz trunk voice radio system. This was achieved through effective dialogue and in partnership with Industry Canada. Given the significant capital costs involved in the development and installation of this system, it is envisioned that it will meet our needs for the next decade. However, at that time, it would be prudent to have a broader spectrum option in the 700 MHz range.

In order to address our broader interoperability needs during the short term, the Emergency Services of Toronto are advocating the expansion of voice radio infrastructure for the International Tactical Communications (ITAC) frequencies. In our discussions with the provincial government we have identified that there is a clear need for an interoperable voice radio network for police services across Ontario to replace the Ontario Police Common Channel infrastructure. The Toronto Police Service, and other police services operating voice radio systems in the 800 MHz range have mutually agreed, in principal, to ad hoc use of the existing dedicated ITAC and ICALL frequencies. However, the existing structure of this system only allows for very localised voice radio communications, where there is clearly a need for a wider area network, supported by an interconnected repeater infrastructure. Given the scope of such a network, and the cross jurisdictional nature and benefits, such an undertaking is clearly within the scope of the provincial government, and it appears to be a place in which the province's leadership and participation are both required and desired.

While we wholly support, in principal, the concept being advanced by Mr. L'Abbé and Mr. Poirier we would hope that such a venture would include the support and co-operation of the CACP and the CAFC as the voice of police and fire service executives across the country, along with APCO Canada. Further, we recognize this as a long-term issue, and we would want to underscore that local short-term interoperable initiatives still require support and funding. Finally, while we would support federal grant funding for this process, we have concerns about the long term funding requirements for such an undertaking.

Superintendent. Wm. Holdridge
Unit Commander
Communications Services
Toronto Police Service

**Comments of
David E Campbell
A/Manager
P.E.I. Emergency Measures Organization**

P.E.I. Emergency Measures has the Provincial Intragrated Radio System. This system is owned by the Province as well as six repeater sites. The system can allow all emergency groups to communicate to each other but on a limited manner. A RCMP car on site cannot speak to the other responding agency but can direct information through their tele-coms center. This is a hardware problem as the RCMP do not install the PICS radio in their vehicles. They are concerned about not being able to maintain a taped record of calls on the system.

We are very interested in your project and do agree that all agencies must be able to communicate with each other. This should also have the ability for special teams such as Heavy Urban Search and Rescue Teams to be able to move across Canada and be able to communicate. I would like to see all Provincial Emergency Measures groups in Canada be part of a study and also the Federal Offices of Critical Infrastructure Protection and Emergency Planning be very involved.

Our concerns are being able to see a system that will not only serve our provincial interest but be able to be part of a national system, so if and when required as per our inter-provincial agreements we can communicate with other teams in responses.

The cost factor to our province is a major concern as we have a very limited budget. The other concern is how do we educate users, political masters and the general public. The majority of responders in Canada are volunteers so the system has to be user friendly.

I also work as a police officer with a small municipal police department and have see the frustration of not being able to use something like the CPIC system due to the lack of communications between police forces. There is a great gap and it does need to be fixed.

**Comments of
Doug Hammer, 1st Vice President
New Brunswick Association of Fire Chiefs**

Our view though, may be somewhat divergent on the issue of fire service communications. Mike's municipality (Halifax regional) has made the decision to move to 800 MHz digital trunk was a municipal decision. The decision for the Province of Nova Scotia has made regarding its TMR radio system, is still sending concern amongst many of their firefighters who do not view their "state of the art system" with the enthusiasm that the marketers and other users do.

Conversely, New Brunswick is looking at replacing their UHF/microwave provincial system. The Fire Service in this province, through the New Brunswick Association of Fire Chiefs (NBAFC) have and continue to lobby hard against the imposition of a trunk solution that will remove some of the current voice and redundancy capabilities of analog technology.

I well recall attending the Canadian Association of Fire Chief's conference in Calgary last September and sitting in on a presentation of Motorola regarding "state of the art technology"; the presenter began by stating "we are not here to talk about analog technology" and went through his presentation regarding technology Motorola was developing to "assist the fire service". When the presentation ended, the first question related to problems with Motorola voice pagers and poor product service and design.....it was quite clear that Motorola had an agenda that was quite different from many of the fire service folks present.

I look forward to our continued dialogue and inclusion in the project. We would also be interested, should there be an opportunity, to present a position paper on some fire service needs. I fully realize that proposed FCC changes may be dictating much of this but I think that increased vigilance by Industry Canada to current VHF/UHF frequencies and the allocation of same could assist many departments in meeting their future communication needs.

**Comments of
Lee Grant
Fire Chief
Peterborough Fire Dept.**

The recommendations of the report and the discussion of what the new organization would look like are right on track for the most part. I believe that further emphasis needs to be placed on the multi function role of the organization in representing public safety. There are many public safety issues that need a federal involvement and should be lobbied at that level. In addition the diversity of Canada requires that a Provincial voice is represented to fully understand interoperability issues and therefore while the CAFC is a national association it has no up to date understanding of local public safety interoperability issues or trends. I believe that Provincial Associations in each discipline would bring much more current info to the table and also allow for an effective lobby at the Provincial level when necessary.

**Comments of Douglas MacDonald
Ambulance Operators Association of PEI**

The concept is sound and will happen eventually. The project needs \$\$'s to move forward. PEI maybe the starting point needed in order to move this project along. As you mentioned we are a Province and maybe just the right size as a test beta site. You use small sticks to start a major fire. If I am able to help in any way, please do not hesitate to contact me.

Comments of
Ron Dingwell
Atlantic Region - RCMP

Gentlemen,

Superintendent Lipsett has directed me to review your drafts and provide comments on behalf of Atlantic Region.

First let me commend both John & Roger for putting together an excellent document that encompasses many of the requirements & needs of the Public Safety community.

I strongly agree with recommendation # 5 that a permanent body needs to be created.

Appendix 6

Who speaks for Public Safety in the U.S.?

Association of Public Safety Communications Officials (APCO Intl.)

APCO is the oldest and largest non-profit organization dedicated to the enhancement of public safety communications. With more than 16,000 members around the world, APCO International exists to serve the people who manage, operate, maintain, and supply the communications systems. APCO is very active in regulatory and legislative issues affecting public safety.

National Public Safety Telecommunications Council (NPSTC)

Formed May 1, 1997, the National Public Safety Telecommunications Council (NPSTC) is a federation of associations representing public safety telecommunications. The purpose of NPSTC is to follow up on the recommendations of the Public Safety Wireless Advisory Committee (PSWAC). In addition, NPSTC acts as a resource and advocate for public safety telecommunications issues.

Coalition for Improved Public Safety Communications (CIPSC)

This is a relatively new organization focused on the needs of first responder agencies. CIPSC is a coalition of six organizations including the NSA, APCO, IACP, IAFC, MCC and MCSA

National Telecommunications & Information Administration Public Safety Program Office (NTIA)

NTIA, an agency of the Department of Commerce, is the Executive Branch's principal voice on domestic and international telecommunications and information technology issues. NTIA works to spur innovation, encourage competition, help create jobs, and provide consumers with more choices and better quality telecommunications products and services at lower prices.

Public Safety Wireless Network Program (PSWN)

PSWN is a joint Department of Justice and Department of Treasury program dedicated to the establishment of a seamless, coordinated public safety communications system for the safe, effective, and efficient protection of life and property. Promotes effective public safety communications and fosters interoperability among local, state, federal, and tribal communications systems.

United Telecom Council (UTC)

UTC is the telecommunications and information technology association for utility, energy and other critical infrastructure companies. UTC has been at the forefront of issues involving utility telecommunications and is an active lobbyist on regulatory and legislative issues affecting telecommunications.

Major Cities Chiefs Association (MCC)

Fifty-seven major law enforcement organizations in the United States and Canada comprise the membership of the Major Cities Chief's Association. MCC has had significant involvement in the interoperability debate and has even filed comments in Canada on spectrum issues.

Major County Sheriff's Association (MCSA)

MCSA is a professional law enforcement association of elected sheriffs representing counties or parishes with 500,000 population or more who are dedicated to preserve the highest integrity in law enforcement and the elected Office of the Sheriff.

International Association of Chiefs of Police (IACP)

The International Association of Chiefs of Police is the world's oldest and largest nonprofit membership organization of police executives, with over 19,000 members in over 100 different countries. IACP's leadership consists of the operating chief executives of international, federal, state and local agencies of all sizes. IACP is very active in legislative and regulatory matters affecting law enforcement.

International Association of Fire Chiefs (IAFC)

The International Association of Fire Chiefs (IAFC) is a powerful network of more than 12,000 chief fire and emergency officers from around the world. IAFC speaks on behalf of its members on a broad range of legislative issues and regulatory matters including interoperability.

National Task Force on Interoperability (NTFI)

BTFI was formed as a follow-up to the 2001 National Public Safety Wireless Interoperability Forum in order to raise public safety wireless interoperability to the national level, and to give Forum participants the opportunity to develop a list of actions that could be taken to overcome the policy barriers to improving public safety wireless communications. NTFI involved the cooperation of 18 national associations representing State and local elected and appointed officials. NTFI is funded by the National Institute of Justice, Office of Science and Technology.

National Law Enforcement and Corrections Technology Center (NLECTC)

Created in 1994 as a component of the National Institute of Justice's (NIJ's) Office of Science and Technology, the National Law Enforcement and Corrections Technology Center (NLECTC) system serves as the "honest broker" offering support, research findings, and technological expertise to help State and local law enforcement and corrections personnel perform their duties more safely and efficiently.

National Emergency Management Association (NEMA)

NEMA is the professional association of and for state emergency management directors. It provides national leadership and expertise in comprehensive emergency management.

National Sheriffs' Association (NSA)

NSA serves the law enforcement/criminal justice professionals dedicated to raising the level of professionalism among those in the criminal justice field.

Industrial Telecommunications Association (ITA)

Founded in 1953, ITA is a national trade association dedicated to preserving spectrum rights and access for private wireless licensees. As the national advocate and service organization for private wireless licensees and radio dealer providers, ITA represents the private wireless industry's business interests before the FCC and Congress.

Federal Wireless Users Forum (FWUF)

The Federal Wireless Users' Forum is an association of individual Federal Government wireless users. The Forum is chaired by the Office of the Manager, National Communications System (OMNCS) and the National Security Agency.

Association of Telecommunications Professionals in State Government (NASTD)

NASTD, the Association for Telecommunications and Technology Professionals Serving State Government, is a member-driven organization whose purpose is to advance and promote the effective use of telecommunications technology and services to improve the operation of state government.

International Municipal Signal Association (IMSA)

An international resource for information, education and certification for public safety officials.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO is a nonprofit, nonpartisan association representing highway and transportation departments in the 50 states, the District of Columbia and Puerto Rico. It represents all five transportation modes: air, highways, public transportation, rail and water. Its primary goal is to foster the development, operation and maintenance of an integrated national transportation system.

National Association of State Information Officers (NASCIO)

NASCIO represents state chief information officers and information resource executives and managers. The association shapes national IT policy through collaborative partnerships, information sharing and knowledge transfer across jurisdictional and functional boundaries.

References

Documents

"Emergency Telecommunications Programs in Canada", presentation by Michel Milot, Industry Canada, January 2003

"Radio Frequency Spectrum and Public Safety" Industry Canada presentation to Ontario Association of Chiefs of Police, February 2003

"Why Can't We Talk – Interoperability – Working together To Bridge the Communications Gap to Save Lives", National Task Force on Interoperability, February 2003

"Summary Report on National Public Safety Radiocommunications Conference - Issues and Potential Scenarios", PWC Consulting, April 2002.

"Interoperability of Public Safety Radio Systems", Ted Campbell, Radio Advisory Board of Canada, April 2002

"Current Technology Solutions to Communications Interoperability - Current and Emerging Solutions", Current and Emerging Solutions to Public Safety Communications Interoperability Summit, PSWN, June 11, 2002

"Communications Interoperability 101", Current and Emerging Solutions to Public Safety Communications Interoperability Summit, PSWN, June 11, 2002

"Proposal to Introduce the Mobile Service on a Co-primary Basis with the Broadcasting Service in the Frequency Band 746-806 MHz", Industry Canada Gazette Notice No. DGTP-004-01, June 8, 2001

"Proposal to Introduce the Mobile Service on a Co-primary Basis with the Broadcasting Service in the Frequency Band 746-806 MHz", Comments of the Association of Public Safety Communications Officials of Canada (APCO Canada), September 2001

"Proposal to Introduce the Mobile Service on a Co-primary Basis with the Broadcasting Service in the Frequency Band 746-806 MHz", Comments of the Canadian Association of Broadcasters (CAB) September 2001.

"Communications Planning and Coordination for Emergencies – A Step by Step Guide to Planning for Communications Interoperability", Motorola 2002

"Proposal for Interoperability Spectrum Use by Public Safety Organizations in Canada" Industry Canada proposals for the Radio Advisory Board of Canada Mobile and Personal Communication Committee Public Safety Subcommittee. June 20, 2002

"Emerging Advanced Wireless Technologies" presentation by Al Ittner, Manager Spectrum and Regulatory Strategy, Motorola, to APCO Annual Meeting, October 8, 2002

"Funding Interoperability" John S. Powel, Public Safety Report, Nov-Dec 2002.

"Understanding Wireless Communications in Public Safety – A Guidebook to Technology", National Law Enforcement and Corrections Technology Center, National Institute of Justice.

"Practical Interoperability" submission by Ted Campbell, RABC February 10 2003 (Available at pscom.ca)

"Criteria for Federal Funding for First Responders to Improve Public Safety Communications & Interoperability", Grants Discussion Meeting, Washington DC, February 7, 2003

"Comments from Toronto Police Communications Services", March 14, 2003

"Commercial Systems for PPDR Use - An Example" - Contribution from Bob Simmonds, Telus Mobility

"Improving Radiocommunications of Public Safety in Canada" Industry Canada meeting with RBP Associates, December 16, 2002

"When They Can't Talk, Lives Are Lost – What Public Officials Need to Know About Interoperability" National Task Force on Interoperability, February 2003

Web Sites

Radio Advisory Board of Canada

<http://www.rabc.ottawa.on.ca>

Association of Public Safety Communications Officials (Canada)

<http://www.apco.ca>

Office of Critical Infrastructure Protection and Emergency Preparedness

http://www.ocipep.gc.ca/home/index_e.asp

Industry Canada Emergency Communications

<http://spectrum.ic.gc.ca/urgent>

Canadian Association of Chiefs of Police

<http://www.cacp.ca>

Canadian Association of Fire Chiefs

<http://www.cafo.ca>

Association of Public Safety Communications Officials (APCO Intl.)

<http://www.apcointl.org>

National Public Safety Telecommunications Council

<http://nlectc.dri.du.edu>

National Telecommunications & Information Administration Public Safety Program Office

<http://pswac.ntia.doc.gov/pubsafe/index.htm>

Public Safety Wireless Network Program

<http://www.pswn.gov>

United Telecom Council

<http://www.utc.org>

Major Cities Chiefs Association

<http://www.neiassociates.org/about.htm>

International Association of Fire Chiefs

<http://www.iafc.org>

International Association of Chiefs of Police

<http://www.theiacp.org>

National Task Force on Interoperability

<http://www.agileprogram.org/ntfi/publications.html>

American Association of State Highway and Transportation Officials (AASHTO)

<http://www.aashto.org>

National Law Enforcement and Corrections Technology Center

<http://www.nlectc.org>

National Emergency Management Association

<http://www.nemaweb.org/index.cfm>

National Sheriffs' Association

<http://www.sheriffs.org/>

Industrial Telecommunications Association

<http://www.ita-relay.com>

Federal Wireless Users Forum
<http://dns.antd.nist.gov/fwuf>

Association of Telecommunications Professionals in State Government
<http://www.nastd.org/>

International Municipal Signal Association
<http://www.imsasafety.org>

National Association of State Information Officers
<https://www.nascio.org/>

